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SYRIAN ARAB REPUBLIC

Participation and technical co-operation programmes

A Scientific Documentation Centre for the Syrian Ministry of Higher Education

by H.C. Adams

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SYRIAN ARAB REPUBLIC

A SCIENTIFIC DOCUMENTATION CENTRE FOR THE SYRIAN MINISTRY OF HIGHER EDUCATION

by H.C. Adams

Report prepared for the Government of the Syrian Arab Republic by the United Nations Educational, Scientific and Cultural Organization (Unesco)

U N E S C O

Technical Report
PP/1984-1985/VII.2.2
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PREFACE

The mission described in the present report was carried out from 18 December 1985 to 12 January 1986 at the request of the Government of the Syrian Arab Republic and was funded by Unesco under its Participation Programme for 1984-1985.

The terms of reference of the mission were:

a) to elaborate a general plan for the establishment of a scientific documentation centre and set out a timetable for the implementation of activities;

b) to establish general guidelines for the creation of an automated information system and evaluate its needs and costs;

c) to arrange a seminar on the organization and management of an automated documentation centre.

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SUMMARY OF RECOMMENDATIONS AND TIMETABLE

Recruitment of senior staff. A director, senior abstractor and data base manager should be recruited during 1986.

Temporary accommodation. A pilot scheme should be organized as soon as possible with acquisitions from the universities being abstracted and stored in a paper copy store (equipped with shelving for the photocopies).

Information scientists. At the end of 1986 abstractors should be recruited.

Data entry, bulletin, and index software. This can be written in-house during 1986/7. Live operation and bulletin production could be scheduled for the end of 1987.

IBM microcomputer. Because of the great potential (use of CDS/ISIS, etc.) it is recommended that this machine (and letter quality printer) be purchased. Discussions should also be initiated with the Documentation Division of the Unesco Library about the provision of an Arabic version of CDS/ISIS.

DIALOG. Access to this service would be of great benefit to the Centre. Repackaging of scientific information could be greatly enhanced thereby.

Tenders. On the assumption that the new building will be ready by 1989 tenders for additional computer equipment and reprographic equipment could be invited at the end of 1988 (see Figure 18).

Staff. The full complement of clerks, typists, and operators should be recruited in 1988.

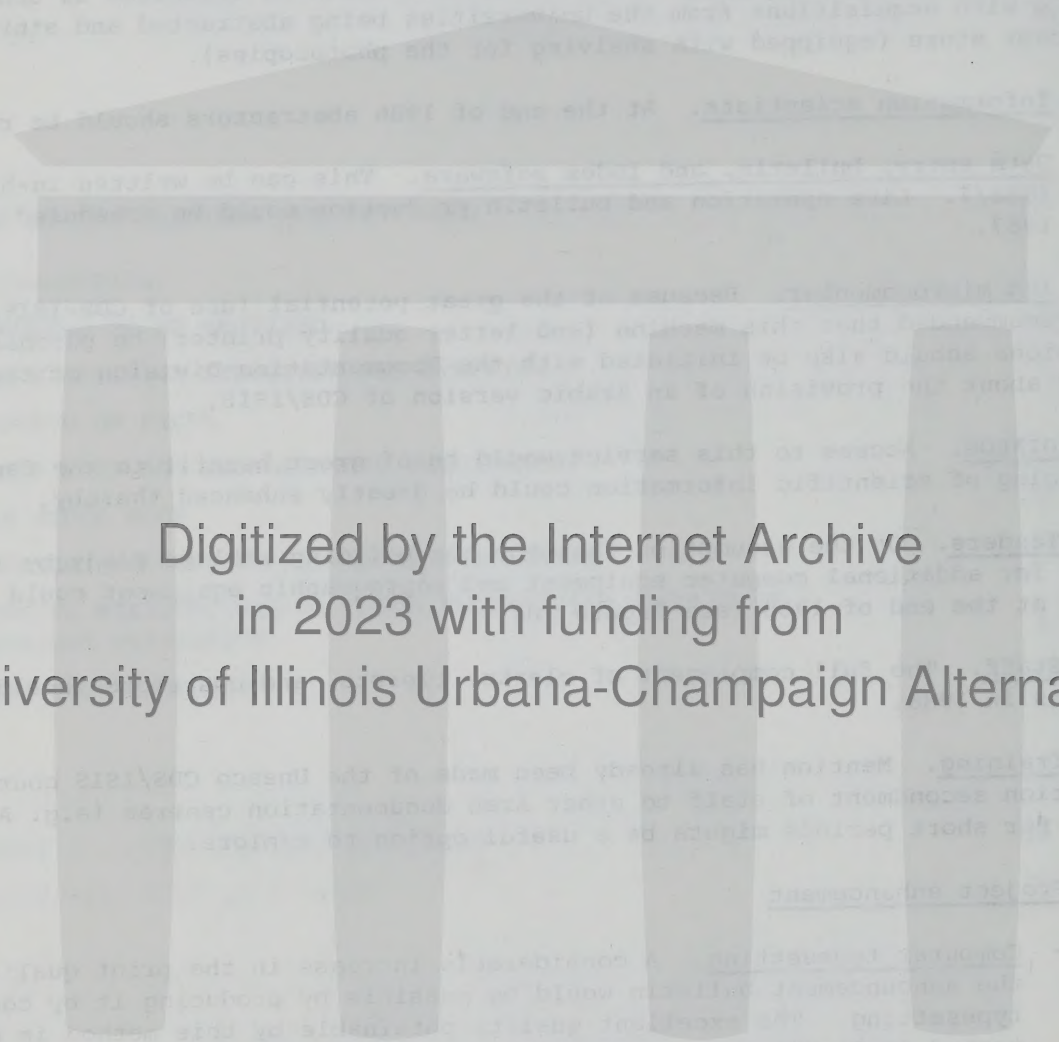
Training. Mention has already been made of the Unesco CDS/ISIS courses. In addition secondment of staff to other Arab documentation centres (e.g. Arab League) for short periods mights be a useful option to explore.

Project enhancement

- Computer typesetting. A considerable increase in the print quality for the announcement bulletin would be possible by producing it by computer typesetting. The excellent quality obtainable by this method is demonstrated in Figure 19. A magnetic tape or disc with the machine readable records on it could be used as input to a computer typesetting equipment. In the 1990's the Centre might wish to consider adapting this method.
- Computer output on microfilm. Another option which might be examined at a later stage is COM. Figure 21 illustrates its use.

COMMENT

Most information centres create their own files for proprietary information and for information which is needed but is not available from outside sources. Figure 20 gives a résumé of the processing discussed in this report. The centres complement these internal files with magnetic tape services containing useful information already acquired, screened, indexed, and recorded by the experienced and expert staff of other centres and service suppliers. Finally they make use of on-line information services (often via specialized telecommunication networks, the use of which tends to minimize costs). An Arab League Documentation Centre process sheet is shown as Figure 22 for information.



I. INTRODUCTION

1. The Scientific Documentation Centre may be defined as a centralized organization which will process scientific and technical reports, learned journal articles, and patents for the universities, research associations, industrial laboratories, scientists and engineers of Syria. It will provide computerized information dissemination and retrieval services.

2. The principal reasons for establishing a scientific documentation centre are:

a) Efficient information management. Information is a major resource. Significant advances in information processing and communications are taking place. Computers have become more powerful while at the same time their cost has declined. The emergence of data base management systems and software has given the computer user the ability to implement his own requirements. Powerful distributed processing and networking software is also manufacturer supplied. A centralized scientific documentation centre can, using its computerized facilities, provide scientists, engineers, planners, and managers with an on-line scientific enquiry service, selective dissemination of information on a regular basis according to specialized subject interests, and access to reports, papers, patents, and journal articles whose citations will appear in the Centre's regularly published announcement bulletins;

b) Networking. The Centre will be able to contribute to a network of information systems in the developing countries and thus take a leading role in technology transfer.

c) Problem solution. The Centre should attract queries from scientists and researchers and act as a focus for the repackaging of information on scientific skills and processes for the easier assimilation of such information by the recipients;

d) Staff specialization. Information scientists can be employed with a degree of individual subject specialization.

e) Automation. The volume of work handled by the Centre will justify computer processing thus giving the advantages of speedier and more efficient processing, and the creation of a data bank at the heart of the information services. Information can be processed, sorted, and analysed in ways not possible with manual methods.

II. SERVICES TO BE PROVIDED

3. Figure 1 shows the inputs and outputs proposed for the Centre for the Syrian Ministry of Higher Education.

a) Announcement bulletins and indexes

4. The Centre should produce a fortnightly subject classified accession list of abstracts for reports, journal articles, and patents currently acquired. Subject sorting of NTIS codes could be employed for these accession lists. A sample output for the bulletin is shown in Figure 2 (an Arabic version should be possible). An item key is shown in Figure 3.

b) Selective Dissemination of Information (SID)

5. Identification of user. This service is intended to carry information to the scientist in his laboratory or workplace. The user must be clearly identified,

his needs ascertained, and SDI provided to him systematically and periodically (say fortnightly). Either a user is selected because of the key position he occupies in an organization or he asks for the service of his own volition.

6. User subject interest profile. A detailed profile of the user's subject interests, functions, and background is prepared. The profile is analysed, evaluated, converted to a computer enquiry profile using Boolean combination (AND, OR, NOT), and stored in the computer.

7. SDI printout. Each fortnight the scientific reports and other accessions for that period are matched against the user profiles stored in the computer. A printout of 'hit' bibliographic citations (complete with abstracts) is then mailed to the user. A key to the item format is shown in Figure 4.

8. User feedback. Figure 5 illustrates the working of the SDI service. It is important that the system takes into account feedback from users on the usefulness and relevance of the SDI material provided to them. The system should be fully responsive to user feedback.

9. Benefits of SDI. If the SDI service is properly conducted it will create a positive impact on users and will considerably influence their information usage. The general level of information awareness among the recipients of the service will be greatly enhanced.

10. Supply of paper-copy. While the SDI service will identify reports of use to scientists, the reports they then request (using an order form attached to the SDI printout) must be readily supplied to them from the Centre's document store.

11. Data bases scanned for SDI. The SDI service can be based on a fortnightly scan of (i) the Centre's accessions; (ii) magnetic tapes from overseas (e.g. INSPEC, NTIS, etc.).

c) Retrospective search enquiry service

12. User contact with the Centre. This enquiry service involves regular contacts by the Centre's information scientists with the Syrian universities and other enterprises. Selected and evaluated information to answer an enquiry must be supplied. Retrospective search of both the Centre's own data base and of overseas data bases (e.g. via DIALOG) should provide bibliographic reference citations in the required subject field. Figure 6 shows the working of the enquiry system.

13. Tailored and evaluated information packages. Often what a user most needs is not the original documents but information specifically tailored in response to his enquiry, in Arabic, and at his own level of understanding. The quality of an information service at this level is assured by the Centre's abstractors being authorities in the subject matter of the enquiry. The Centre should be one of excellence and information staff need to be responsive to user needs and to offer evaluated, selected, synthesized, and repackaged information. The Centre could also make regular contributions to Syrian scientific journals on research in topical and innovative fields. In this way a useful contribution to the solution of user problems can be made by the Centre.

14. On-line searching. On-line searching provides the raw material for the production of tailored information packages. On the Centre's data base the searcher should have the capability of locating subject source information by simply typing words or phrases describing the topic. He can search title and abstract words, personal or corporate authors, dates, subject classification codes (call numbers) or other specified portions of the machine readable bibliographic record. By Boolean combination of concepts information as specific or as broad as desired can be obtained. Full bibliographic citations including abstracts can be printed out for the user.

15. Hard copy back-up. The full text of the documents located by the on-line search must be available to the user from the Centre's document store.

16. On-line service suppliers. Numerous on-line data base vendors have been established and the Centre will be able to conclude agreements with one or more of these.

17. DIALOG data bases. The DIALOG Information Retrieval Service has been serving users since 1972. Now with more than 170 data bases available on the system, the DIALOG service offers very good subject balance and variety. Also the DIALOG searching capabilities and strengths make it a powerful on-line searching system.

18. DIALOG subscription. A DIALOG password would be sent to the Centre after the receipt by DIALOG of a completed order form.

19. DIALOG charges. The DIALOG service charges only for the time used, based on the amount of time the terminal is connected to the DIALOG computer. There is also a small charge for each citation requested to be printed off-line and posted to the user. Rates for both on-line usage and off-line prints vary depending upon the data base used. Charges to the Centre will probably average $80 to $120 per hour.

20. Telephone access to DIALOG-IDAS. Users may chose to dial directly to the DIALOG computer in Palo Alto, California. Alternatively to minimize telecommunication costs the Centre could make use of the International Data Base Access Service (IDAS) (details from Cable and Wireless PLC). Advantage can then be taken of the lower tariffs applicable on the IDAS packet switched data transmission network as compared with the higher charges applicable on the normal telephone system.

21. Search strategies on DIALOG. The various data bases available differ in their indexing and other documentation features. Expertise will come with experience. A sample search is shown as Figure 7.

d) Request service for users

22. Paper copy and/or fiche should be made available to the user either on a free issue, loan, sale (prepayment), or credit sale basis (according to user status). Document status codes may also be employed if certain reports are subject to security restrictions.

III. ADMINISTRATIVE STRUCTURE AND STAFFING

23. The structure for the Centre has to be designed bearing in mind its intended purpose and objectives (summarized at Figure 8). A proposed organization is shown as Figure 9.

24. The director should possess the following:

a) A university degree in science;

b) Information Science qualifications at a post graduate level;

c) Some years experience in a managerial position;

d) Knowledge of computers and Documentation Centre automation.

He or she should be personable, possess strong leadership qualities, have considerable power of persuasion and be able to interact with government ministers.

His/her principal responsibilites will include the following:

a) To manage and administer the Centre effectively;

b) To direct and motivate staff;

c) To prepare an annual budget for ministerial approval;

d) To monitor the operation of the system and ensure that appropriate statistical, cost and other records are kept;

e) To ensure the maintenance of minimum standards of performance;

f) To plan and prepare enhanced and new services;

g) To prepare progress reports for ministerial approval.

25. The data base manager provides the link between the Centre's abstracting services and document store and the bibliographic reference and inventory data stored in the computer files. The responsibilites of the data base manager include:

a) Effective management of computer hardware, software, date entry and retrieval;

b) The creation of data bases and their security attributes;

c) The specification and maintenance of special attributes of the Centre's system, e.g. the thesaurus;

d) The assignment and creation of inverted files. The significance of an inverted file in a retrieval system is shown at Figure 10;

e) The exploitation of magnetic tapes from service suppliers;

f) Data base maintenance and update;

g) Recovery from computer breakdown and/or loss of data;

h) The ongoing correction of data base errors;

i) The modification (as necessary or when requested) of user prompts and responses;

j) Control and scheduling of batch work.

The data base manager should have had several years experience in designing, implementing, and operating computer systems. If possible he should possess a degree in computer science.

26. Chief information scientist and abstractor should possess a university degree in science and have studied information science at the post graduate level. He should be well known and respected in documentation circles and have a gift for lucidity and authorship. While erudite in science his knowledge in other fields should be broad and understanding.

27. Other key senior staff. The success of the Centre will also depend on the effectiveness of the following:

a) Print and reprographic supervisor;

b) The chief clerk.

28. Staff summary

The staff requirement is as follows:

Information analysts and abstractors	4	graduates
Analyst/programmer	1	graduate
Computer operators	2	secondary school
Clerks (data handling)	2	secondary school
Clerks (acquisition recording and request handling)	4	secondary school
Specialist typists (data entry)	3	secretarial college
	20	
Senior staff	5	
Total	25	

IV. REPORTS ON FICHE

29. The two primary reasons for having microform may be distinguished as:

a) Reduction of volume;

b) Permanent retention of documents that otherwise would be lost because of the deterioration of the paper on which they are printed.

30. Microfiche is essentially a special format of microfilm. A page image is reduced to a microfilm size appropriate to the fiche format required, and a number of these images are grouped together on a flat rectangular format. 60 (x 20), 98 (x 24), and 208 (x 42) page images on a 4 x 6 inch microfiche may be obtained.

V. PRINT ROOM REPROGRAPHIC REQUIREMENT

31. The reprographic facilities required are:

a) Plate making and printing of bulletins, etc.;

b) Fiche to fiche duplication;

c) Paper copy from fiche;

d) Paper copy from paper copy (photocopy);

e) Fiche from paper copy;

f) Fiche storage.

32. Reprographic equipment. Suitable equipment is detailed in Annex I and includes names of suggested suppliers. It is unlikely that the overall cost will be less than $100,000.

VI. THE STOCK ROOM

33. Paper-copy collection. After acquisition there should be long-term preservation and retention of documents and other information holdings. A paper-copy stock room has to be provided with shelf locations corresponding to accession numbers. The purging of unused or outdated information and the accurate retention of that of value are of equal importance to the success of the documentation Centre.

34. Fiche. Automated mechanical storage containers are required from which the required fiche to satisfy requests can be rapidly retrieved.

VII. DOCUMENT PROCESSING AND RETRIEVAL SYSTEM

a) Bibliographic information storage and retrieval

35. Information retrieval involves: a) acquisition and selection; b) analysis, classification, indexing, item numbering, and storage; c) retrieval and dissemination; d) the interface of the system with the user, since the success of the system depends upon the extent to which the user can define satisfactorily his requirement in terms understood by the system.

36. Subject classification. A report or article is classified by allocating to it subject classification codes. For the Centre these could be the NTIS subject codes.

37. Indexing. An article is indexed by allocationg to it terms (descriptors) chosen from a controlled list called a Thesaurus. Certain of these descriptors can be preceded by an asterisk to indicate that they can be used as subject headings for subject indexes.

38. Controlled language. The rules and conventions governing the selection of descriptors are contained in the Thesaurus as are various indexes which facilitate its use. The descriptors within each generic family are classified in the Thesaurus into hierarchical categories according to their level of specificity. The Thesaurus contains main terms below each of which are listed Broader Terms (BT) and Narrower Terms (NT) and Related Terms (RT), together with USE and USE FOR (UF) terms where applicable. The Thesaurus publication contains also Permuted and Hierarchical Indexes.

39. Information retrieval files. Each acquisition is described by a record (citation) which contains the main bibliographic details (title, author, etc.) plus a field containing descriptors. Retrieval from the file is effected by comparing the keywords for each record (e.g. Author, Descriptor, Rear truncated Descriptor, Subject Code, Free-text term in Title, etc.) with the keyword combination specified for the enquiry (search profile). When a match is achieved, details of the record are output.

40. Inverted file. To overcome the drawbacks associated with serial searching (very long search times), inverted files are employed. The inverted file consists of a structured list of record identification numbers for each keyword. The inverted file uses the keyword as the search key. Incoming documents (acquisitions) are given accession numbers, according to a sequential system. This accession file is inverted by software, i.e. keywords are extracted from the accession file record, sorted, and after elimination of duplicates posted to an inverted file. Against each keyword in the inverted file there is a list of the accession numbers of those documents in which the keyword appears.

41. Boolean logic. The association of terms in a user's search profile can be controlled by three logical search operators:

OR - Search lists resulting from each keyword linked in this way are merged and duplicates eliminated;

AND - Lists for two keywords or combinations of keywords are compared; and those document accession numbers occurring in both lists are passed to an output file.

NOT - Lists from two keywords or combinations thereof are compared and those record numbers occurring in both lists are rejected.

42. The aim of a free text system is to minimi e the indexing required for retrieval, by extracting from the title, abstract and other fields of the citation record keywords for inclusion in inverted files.

43. The distinction between 'Controlled Language' (retrieval by matching on only thesaurus terms) and 'Free Text' retrieval systems is somewhat arbitrary since at the present state of the art, both have features in common. Both involve the creation and update of lists of terms, and, although ideally human intervention should not be required for indexing at the input stage of free text systems, experience is proving that it is only the extent of the manual activity which varies in the two cases. Intellectual effort is required for setting up search statements under each system but the free text approach is simpler from the user's point of view and by allowing searching on words in the title, abstract and other parts of the citation record gives a more powerful retrieval facility than does a controlled language system only able to search the descriptor field of the citation record. The software for the Centre's system should be capable of free text searching. A table of searchable fields for a selection of well known data bases is shown in Figure 11.

b) Acquisition, data entry and storage

44. Figure 12 shows the computer processing required.

45. Process sheet. An example of a process sheet is given in Figure 13. Completing process sheets is very useful for training purposes and the existence of a process sheet will help immensely when designing print formats and preparing indexes.

46. Acquisitions Section. All paper copy reports from authors in universities and research establishments will come first to the Acquisitions Section. Staff there will complete process sheets with all the bibliographic information required with the exception of descriptors and abstracts. The process sheet will then be used as the source document for computer entry.

47. Abstracting and Indexing Section. The Acquisitions Section will pass process sheets together with the paper copy to which they refer to the abstractors (information scientists) who will complete the remainder of the process sheet allocating subject codes and descriptors and writing an abstract on the back of the process sheet. The writing of good meaningful abstracts is an art and information scientists must be good and fluent writers as well as good scientists.

48. Final computer entry. Process sheets and the relevant paper copy items are then returned to Acquisitions Section (specialist typists) who now complete the keyboard entry for each item. Printouts are provided for the day's entries and final proofreading and editing of bibliographic records on the computer is carried out by the chief abstractor on his own VDU/Keyboard. After this at the end of each day the data base manager cumulates the day's accession citation records to an increment file.

49. Document Store and Issue Section. The day following computer entry the batch of process sheets and new paper copy accessions are passed to staff in the Storage and Issue Section who will produce photocopies for the scientific reports and journal articles and store these copies in shelf locations corresponding to their accession numbers.

50. Fiche store. Many centres place a contract with a service supplier (e.g. NTIS) for the fortnightly supply of selected fiche. This fiche is added direct to a fiche store which incorporates mechanical retrieval facilities. The Centre's own reports can also be held as fiche.

c) Announcement bulletin and Index production

51. Increment file accumulation. The daily input will be sorted by subject code and cumulated over a fortnightly period. Variable length records should be employed. Spaces between fields must be eliminated, i.e. the field terminator for each field must be followed immediately by the start of the next field.

52. Increment sort and validation. As well as daily validation at the end of each fortnight the increment file (sorted by accession number within subject code) must be validated and errors corrected. A proof for the announcement bulletin is then printed for the senior information scientist (editor) who should be able to make amendments and corrections from his own terminal. After correction, further validation and sort are required.

53. Bulletin print. Citations can be printed on a letter quality printer (daisy wheel) in a format, complete with subject headings, which after photo reduction (say 66%) will be offset litho printed as the announcement bulletin.

54. Indexes. Indexes to the bulletin can be produced in the manner shown in Figure 14.

d) Selective Dissemination of Information (SDI)

55. SDI increment file. The SDI file (using variable length fields and records) will be generated from each fortnightly increment.

56. SDI retrieval. The SDI retrieval software will employ an inverted file of keywords to provide access pointers to the citations file.

57. Magnetic tapes from service suppliers. As well as SDI from its own fortnightly accessions, the Centre will probably provide SDI to its users from magnetic tapes received from service suppliers (e.g. INSPEC). Programmes to read, code, convert, and reformat these tapes for processing by the Centre's own software will be required.

58. SDI output to users. The SDI output should include:

a) A user name and address sheet;

b) A profile sheet;

c) The retrieved items;

d) An accession number check list to facilitate user ordering for paper copy.

e) Data base creation and retrieval

59. Outline flow chart. The nature of the complete system is shown at Figure 15.

60. Software. Free text retrieval is the ideal, i.e. retrieval should be possible by matching not only keywords and authors but also by matching any string of characters in the record. Inverted files of keywords, authors, words, and phrases taken from the text in the record must provide access pointers to the citations held on the data base. Combination of search terms must be possible using Boolean operators to form compound search strings. Handling commands must provide examination and formatting of the search results.

61. Data base cumulation (update). The data base will be cumulated fortnightly (in batch mode) from the SDI increment file in accordance with the requirements of the retrieval software outlined in 60 above (see Figure 16).

62. User access facilities. The system should allow the user to:

a) Consult a thesaurus on-line;

b) Construct a search profile and logically combine terms describing the subject;

c) Display references in a number of predefined formats, e.g. full, title, accession No., etc;

d) Print at his terminal or off-line useful citations;

e) Repeat the operations under b) and c) using new keywords and modified combinations until he obtains a satisfactory result.

63. Search example. Figure 17 gives an example of a user search using the type of facilities described above.

64. Software capability summary. The data base creation, maintenance and retrieval package must be:

a) Terminal and multi-user oriented;

b) Able to provide an on-line system for storing and retrieving unformatted and/or formatted textual data.

65. Available software packages. Generalized information storage and retrieval software packages designed specifically for the computerized management of data bases include:

a) ISIS for IBM main frames;

b) CDS/ISIS designed by Unesco for mini and micro computers. This package is very suitable for running on the IBM Personal Computer;

c) STATUS for a wide range of computers (including Systime) and commercially available from the United Kingdom Atomic Energy Research Establishment.

Note. ISIS and CDS/ISIS can be made available free by Unesco to non-profit organizations.

VIII. SYSTIME MINICOMPUTER AT CIVIL ENGINEERING FACULTY OF DAMASCUS UNIVERSITY

66. This equipment was installed during the writer's visit to Damascus. It comprises:

512K CPU (16 bit word);

Single disc controller and drive (13.2 Mb split as 6.6 exchangeable and 6.6 fixed);

2 Arabic/Latin 2000 characters VDU/keyboards;

1 Latin VDU/keyboard;

1 Arabic/Latin matrix printer (180 characters/second);

MPS operating system;

FORTRAN, BASIC, and COBOL;

File handling utilities, editor, etc.

67. The computer (supplied as a result of a gift from Unesco) is under a one year warranty and an annual maintenance contract will have to be provided for it in due course.

68. Development of applications software on Systime machine. The building for the new scientific documentation Centre is not scheduled to be finished until 1988/9. In the interim it should be possible to develop in-house on the Systime machine the following:

a) Data entry software including the provision of entry and editing via screen prompts, sort software for daily and fortnightly sort on subject code (using Systime provided sort utility), validation software, and formatting and updating programmes for cumulating an increment daily over a fortnightly cycle;

b) Bulletin and index software to produce fortnightly announcement bulletins and indexes thereto, and also for the production of 6-monthly indexes to the bulletin;

c) Report handling and issue software to process user requests and the paper copy and fiche issues.

69. Systime local agent. If necessary some of the above programming could be contracted out to the local supplier agency who have an Arabized programming capability and who have already carried out some work for the Syrian National Library. However, this could be to the detriment of staff who could gain valuable experience and know-how by programming this work in-house.

IX. DATA BASE COMPUTER

70. A dedicated minicomputer (cost approximately $50,000) will be needed for the Centre's data base. Assuming about 5,000 new accessions annually the following configurations would suffice:

1 Mb CPU;

100 Mb disc capacity;

6 Arabic/Latin VDU/keyboards;

1 600 lpm line printer;

1 daisy wheel printer;

1 magnetic tape drive (1 600 bpi 9 track);

Any necessary communications equipment for the support of remote terminals.

71. Power supplies. Reliability is very important and therefore stand-by uninterruptable power supplies for use in the case of failure of the public supply should be provided.

72. Tender action for data base computer. Tenders can be invited in 1988 from say the local agents of Systime, NCR, and IBM. It is even possible that an IBM micro might be enhanced in due course (with XENIX multi-user operating system, more disc, etc.) to become the data base computer. As well as CDS/ISIS (supplied free by Unesco) there is a great wealth of software available for the IBM PC.

ANNEX I

REPROGRAPHIC EQUIPMENT

	Basic UK price
	£
1. Platemaking and offset litho printing machines (for producing bulletins, etc).	
(i) ELECTROMASTER AP1 (offset platemaker)	6,500
Supplier: Rotaprint Limited Rotaprint House, Honeypot Lane London NW9 3RE England	
Plus consumable items - Paper, Inks and Damping Solutions.	
(ii) MULTILITH 1250N (offset litho printer)	5,750
Supplier: AM International Information Systems Limited Maylands Avenue Hemel Hempstead Hertfordshire HP2 7ET England	
2. Fiche to fiche duplication equipment -	
404 PRINTER PROCESSOR (Diazo Duplicator)	2,970
Mftr: Bell & Howell Ltd Business Equipment Division 33-35 Woodthorpe Road Ashford, Middlesex TW15 2RJ	
Plus consumable items - Diazo film and Ammonia.	
3. Paper copy from fiche equipment -	
AM BRUNING 1830 Micropublisher Enlarger/Printer	20,000
Supplier: AM International Information Systems Limited Maylands Avenue Hemel Hempstead Hertfordshire HP2 7ET England	
4. Paper copy from paper copy (photocopies) equipment	
(i) CANON NP50 (photocopier)	1,450
Supplier: Canon Business Machines (UK) Ltd Waddon House, Stafford Road Croydon CR9 4DD England	

Annex I

	Basic UK price £
PLUS larger machine -	
(ii) CANON	2,350

Supplier: Canon Business Machines (UK) Ltd
Waddon House, Stafford Road
Croydon CR9 4DD, England

Plus consumable item - Copy paper.

5. Fiche from paper copies

CSR 2001 MICROFICHE CAMERA		10,500
plus DOCUMENT FEED		1,575
and PROCESSOR		2,100
	Total	14,175

Supplier: AM Bruning Limited
123 Hagley Road
Birmingham B16 8LL England

Plus consumable items - Photographic film, Developer and Fixing solution.

6 Fiche storage and retrieval system

MINITRIEVE (automated filing system)	17,500 approx

Supplier: Supreme Equipment & Systems
(Europe) Ltd
3 The Villiers
Gower Road
Weybridge, Surrey England

7. FINISHING EQUIPMENT

Label addressing -

(i) ELLIOTT MOD 4 (automatic address printer)	1,660

Supplier: Dymo Business Systems Limited
International Division
Browells Lane
Feltham, Middlesex TW13 7DY
England

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	Basic UK price £
Microfiche Readers -	
(ii) REGMA R30	130
Supplier: Regma (UK) Limited High Street Houghton Regis Bedfordshire LU5 5QL England	
Page collation equipment -	
(iii) HOBSON AUTOMATIC COLLATOR (15 station)	4,400
plus STACKING SET ALTERNATOR	900
Total	5,300
Supplier: Hobson's Designs Limited 337 High Road Ilford, Essex IG1 1TE	
Wire stitching for general work -	
(iv) BOSTON NO 7 STITCHER (for flat and saddle stitching)	1,940
Supplier: The Monotype Corporation Limited Salfords Redhill RH1 5JP England	
Plus consumable item - reels of wire	
Guillotine for cutting and trimming work -	
(v) FORTE 521/E	1,475
Supplier: Business Aids Limited 3 Whitby Avenue London NW10 7SQ England	
Drilling machine for paper card etc -	
(vi) CITOBORMA 180	680
Supplier: Micrographics Limited Oldmixon Industrial Estate Weston-super-Mare BS24 9AX Avon, England	

Annex I

	Basic UK price £
NEOPOST FOLDING MACHINE F4	
(vii) FOLDER F4	545

Supplier: Roneo Alcatel Limited
Mailroom Division
86-92 Stewarts Road
London SW8 4BR England

NOTE

Ancilliary equipment would be required comprising - strong work top furniture preferably with cupboards beneath, free standing cupboards, chairs for the operators, hand stapling machines, staple extractors, oil, etc.

ANNEX II

LIST OF FIGURES

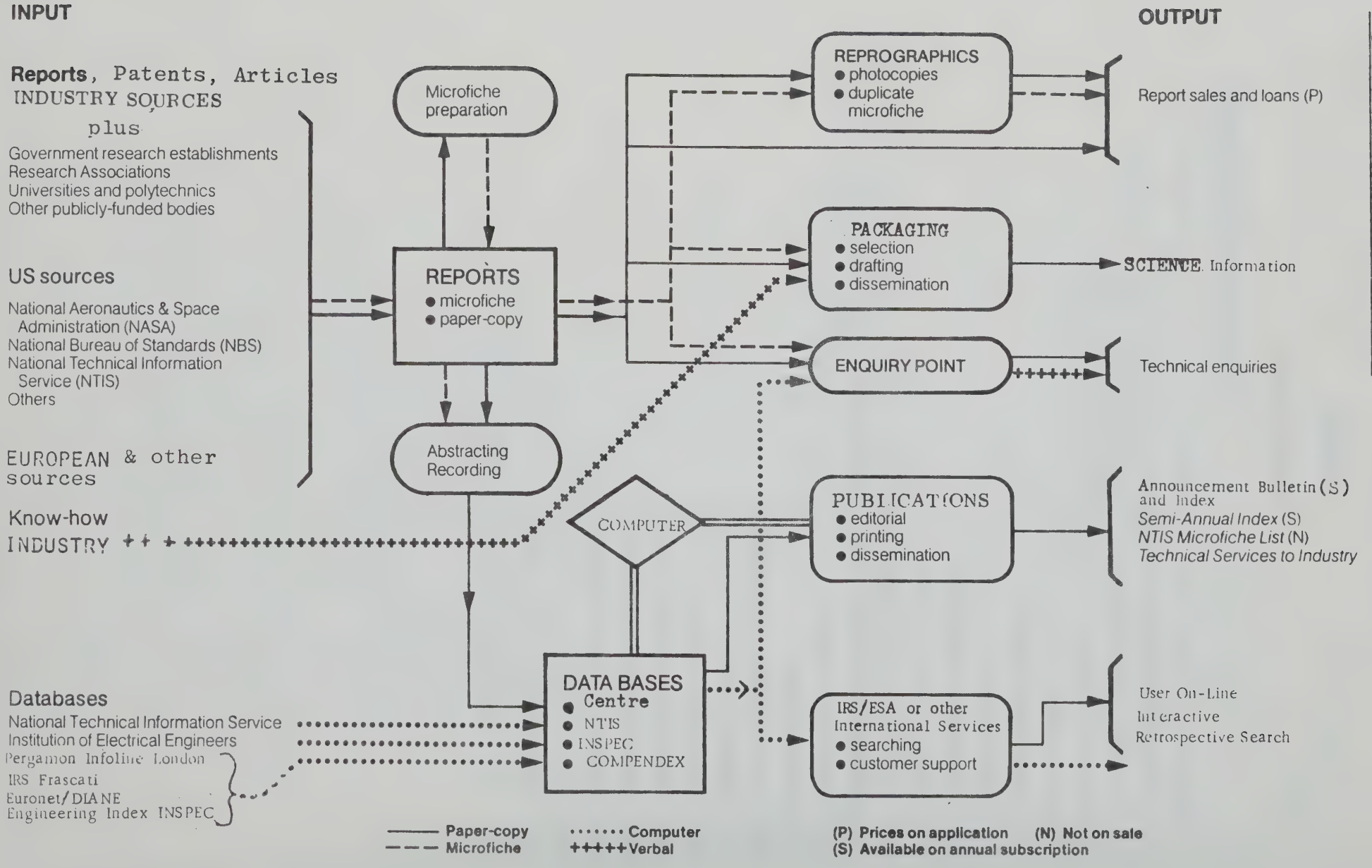


Figure 1

Inputs and outputs for the Centre

flange. The program could be used in determining the minimum weld sizes. A detailed explanation of the rationale of using "ADINA" or similar FEM programs is presented. 1188-4201
*Fillet welds/Mechanical properties/ Specifications/Surveys/Shipbuilding/ Fatigue strength at N cycles/Residual stress/ Weld defects/Inspection/Welding//13E/94G

94H INDUSTRIAL SAFETY ENGINEERING

R80-3625
Telecom,Australia
DANGEROUS GASES IN THE UNDERGROUND NETWORK 1980
43pp
TRC
Gas leakage from a variety of sources into the underground network can result in a build-up of gas in confined spaces with the consequent hazards of fire, explosion, poisoning and asphyxiation. Natural gas pipelines and gas service pipes operating at medium, high and transmission pressures constitute a serious hazard should they be ruptured by mechanical plant during excavating or earth boring operations. Similar hazards also exist from pipelines carrying liquids such as petroleum and other products. Accidents that occur when gas or fuel pipelines are damaged are often disastrous in nature and can lead to loss of life of serious injury, and extensive damage to property. The Engineering Instruction describes the hazards, sets out the working precautions and procedures to avoid accidents due to the presence of gas in the underground network or damage to pipelines, and describes the action to take when gas in detected, or a fire or explosion occurs which causes injury or property damage. 1216-4201
*Gases/*Underground explosions/*Safety/ Hazards/Fires/Explosions/Poisons/ Asphyxia/Accidents//13L/94H/

94I HYDRAULIC AND PNEUMATIC EQUIPMENT

R80-3750 RD-L-N-160-79
Central Electricity Res.Labs,Leatherhead, Surrey
INITIATION OF FATIGUE CRACKS FROM PITS IN A 2.5%NICRMOV ROTOR SHAFT STEEL
Hetterley, L. 01.1980
25pp
TRC
The fatigue properties of 2.5%NiCrMoV Low Pressure (LP) rotor shaft steel in the pitted condition have been studied. In the as-ground condition, fracture initiates at a machining score in the surface. Pitted specimens fail by cracking initiated at oxide pits. Multiple crack initiation occurs at stress amplitudes above the fatigue limit. Secondary cracking is extensive in the specimens with very deep pits and the fracture surface is often composed of more than one crack, on different planes. 1195-4201
*Fatigue (materials)/*Cracks/*Turbines/ Steels/Rotors/Electric generators//13G/ 94I/

94J NONDESTRUCTIVE TESTING

R80-3642 NASA-TM-80225
National Aeronautics & Space Administration,Washington,D.C.,USA
MAGNETIC SUSPENSION AND BALANCE SYSTEMS - A SELECTIVE, ANNOTATED BIBLIOGRAPHY
Tuttle, M. H. Kilgore, R. A. 04.1980
48pp
TRC
The bibliography, with abstracts, consists of 188 citations arranged in chronological order by dates of publications. Selection of the citations was made for their relevance to the problems involved in understanding, designing, and constructing magnetic suspension and balance systems for use in wind tunnels. The purpose of the selective bibliography is to list available publications that might be helpful to persons interested in magnetic suspension and balance systems for use in wind tunnels. Some historical material has been included and the arrangement is chronological by date of publication. Therefore, the collection also serves as a "history" of the development of this type of equipment. 1236-4201
*Bibliographies/*Wind tunnels/*Magnetic measurement/Superconducting magnets/Suspending (hanging)/Balancing//14B/94J/20C/46 /

R80-3726 NASA-CR-3293
National Aeronautics & Space Administration,Washington,D.C.,USA
ULTRASONIC NONDESTRUCTIVE EVALUATION OF IMPACT-DAMAGED GRAPHITE FIBER COMPOSITE
Williams, J. H. Lampert, N. R. 05.1980
24pp
TRC
Unidirectional Hercules AS-3501-6 graphite fibre epoxy composites were subjected to repeated controlled low-velocity drop-weight impacts in the laminate direction. The degradation is ultrasonically monitored using through-thickness attenuation and a modified stress wave factor, SWF. There appear to be strong correlations between the number of drop-weight impacts, the residual tensile strength, the through-thickness attenuation and the SWF. The results are very encouraging with respect to the NDT potential of both of these ultrasonic parameters to provide strength characterizations in virgin as well as impact-damaged fibre composite structures. 1240-4201
*Ultrasonic tests/*Nondestructive tests/ *Graphite composites/*Fiber composites/ *Composite materials/Impact/Damage/Carbon fibers/Attenuation/Stress waves/Degradation/ Quality control/Reliability//14B/94J/

R80-3863 NBS-SP-533
National Bureau of Standards,Washington, D.C.,USA
CHARACTERIZATION OF PARTICLES
Heinrich, K. F. J. 04.1980
13TH Annual Conference of the Microbeam Analysis,Michigan,22.6.1978
234pp
TRC
Contains 13 invited papers on the subject of Particle Characterization. Part of the material included in the publication was presented orally. The publication describes microscopic and analytical techniques for the characterization of single microscopic particles. Applications of these techniques to problems of general interest are also included. Contents: Characterization of particles; Optical microscopy of particles; Variation in X-ray intensity ratios used to identify asbestos fibres; Quantitative analysis of small particles using wavelength and energy dispersive systems in an electron beam instrument; Procedure for the quantitative analysis of single particles with the electron probe; Monte Carlo electron trajectory simulation - an aid for particle analysis; Quantitative characterization of particulates by scanning and high voltage electron microscopy; Characterization of coal gasification particulates by SEM, EDS, AES, XPS, and its relevance to inhalation toxicology; Accuracy of electron microprobe analysis of biological fluids - choice of standard solutions, and range of linearity of the calibration curves; Application of auger-electron spectroscopy and X-ray photoelectron spectroscopy to the characterization of pollutant particles; Secondary ion mass spectrometry for the analysis of single particles; Scope and limitations of single particle analysis by raman microprobe spectroscopy; Laser Microprobe Mass Analysis (LAMMA) in particle analysis. 1244-4201
*Particles/*Microscopy/Particle shape Particle size/Biological agents/Electron microscopy/Electron probes/Micro-analysis/ +Particle characterization/+Microbeam analysis/ +Particulate matter//14B/94J/46C/

Figure 3

Bulletin item format

ACCESSION NO.
ORIGINATORS REFERENCE

R80-7528M SAM-TR-75-28 3202
School of Aerospace Medicine, Brook AFB, Tex., USA. ← ORIGINATOR
EFFECTS OF 19 MHz RF RADIATION ON
NEUROTRANSMITTERS IN MOUSE BRAIN ← TITLE
Merritt, J.H., Frazer, J.W. ← AUTHORS
08.1975 ← DATE
7pp 8ref ← PAGINATION
TRC £0.50 ← AVAILABILITY
Mice were exposed to 19 MHz radiofrequency radiation and then euthanised by microwave-heating brain inactivation. Brain levels of 5-hydroxyindole acetic acid, homovanillic acid, serotonin, norepinephrine, and dopamine were not altered by this radiation. ← ABSTRACT
*Neurology/*Brain/*Mice/*Radiofrequencies//45C/ ← INDEXING TERMS

R80-1297 AFCRL-TR-75-0346 3304 ← INCREMENT NO.
Air Force Cambridge Res. Labs, Hanscom AFB, Mass., USA
COMPUTER MODELING OF MEASUREMENT OF WINDS BENEATH AIRCRAFT USING OMEGA SIGNAL RETRANSMISSION
Morrissey, J.F. 06.1975 23pp 6ref
UL-2114 ← CONTRACT NO.
TRC £1.00 IP-234
The results of a computer model of the problem of measuring wind speed and direction beneath an aircraft with retransmitted Omega signals are presented. The model simulates aircraft motion, sonde motion, signal-to-noise variation, Omega timing sequences and the principal tracking features of the Beukers' WO-3 processing system. This WO-3 processor provides a measurement of the arrival time and signal quality for each of three Omega frequencies for each of four Omega stations. The tracking of only three stations at any one time was simulated.
*Wind velocity/*Aircraft/*Tracking (position)/*Signal processing/Wind direction/Computerized simulation//
O1B/51B/O1C/17C/09B/62B/

Figure 4

SDI item format

AD-A024 861/7SL ← ACCESSION NO.
1020-2
Softech Inc Waltham Mass*Defense Advanced
Research Projects Agency, Arlington, V.A. ← TITLE
TRAIDEX NEEDS AND IMPLEMENTATION STUDY.REPT.
NO. 1 (FINAL)
Young, Carl J. Jones, Reuben S. 14May76 ← AUTHORS
162PP MDA903-75-C-0224 ← CONTRACT NO.
Availability: TRC(U7615)
This report presents the functional design of an information exchange system that will allow developers of military technical training courses to have access to an automated catalog of validated course units that are available for interservice sharing and refuse. The design, which is presented using the structured analysis and design technique (SADT), is based upon the information needs of ← ABSTRACT
technical course developers as revealed by a series of field interviews at over a dozen training headquarters, development sites, and research facilities in three services. The automated catalog allows inquirers to search for units of previously developed technical courseware based on keyword descriptors, the content of formal learning objectives, the media used for presentation, and on many other descriptive fields.
Indexing Terms: *Information systems/*Courses(Education)/ Military training/Information retrieval/Instructional/ Materials/Learning/User needs/Cost analysis/Networks/ NTISDODSD/05B/05I/88B/92A/

AD-A024 864/1SL
DARCOM-ITC-02-08-76 ← ORIGINATORS REFERENCE
Darcom Intern Training Centre Texarkana Tex ← ORIGINATOR
PARAMETERIZATION OF INJURY VICTIM CONDITION AS A FUNCTION OF TIME. FINAL REPT.
Jones, Joe C. May76 ← DATE
86PP ← PAGINATION
Availability: TRC(U7615) ← ANNOUNCEMENT JOURNAL
The report examines the relationship between INCREMENT NO.
response time and fatalities in evaluating an emergency medical service system (EMSS). A search of the literature revealed that adequate data does not exist to presently develop fatality-response time relationships for evaluating EMS systems. The paper proposes a data gathering procedure so that statistics can be derived to use in an EMMS simulation. A gasp simulation program is presented which shows how fatality-response time or injury-response time relationships can be used in evaluating an EMSS.
Indexing Terms: *Medical services/Casualties/Effectiveness/ Wounds and injuries/Parameters/Simulation/Time/Computer programs/Tables(Data)/Classification/Reviews/Response/ Appendices/*Emergency medical services/Health care ← INDEXING TERMS
Delivery systems/Evaluation/Recommendations/NTISDODA/ 06E/44J/

Figure 5

SDI service

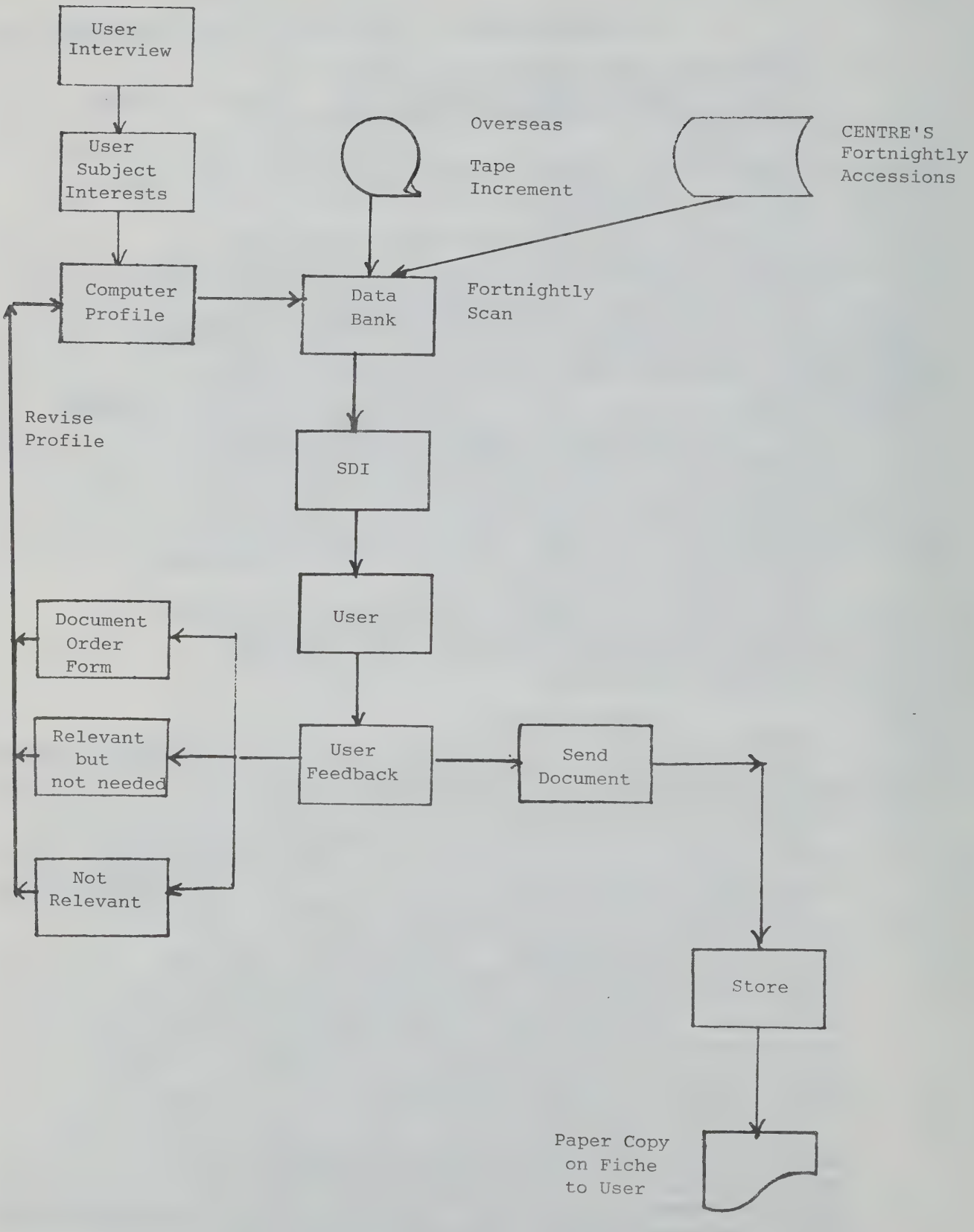


Figure 6

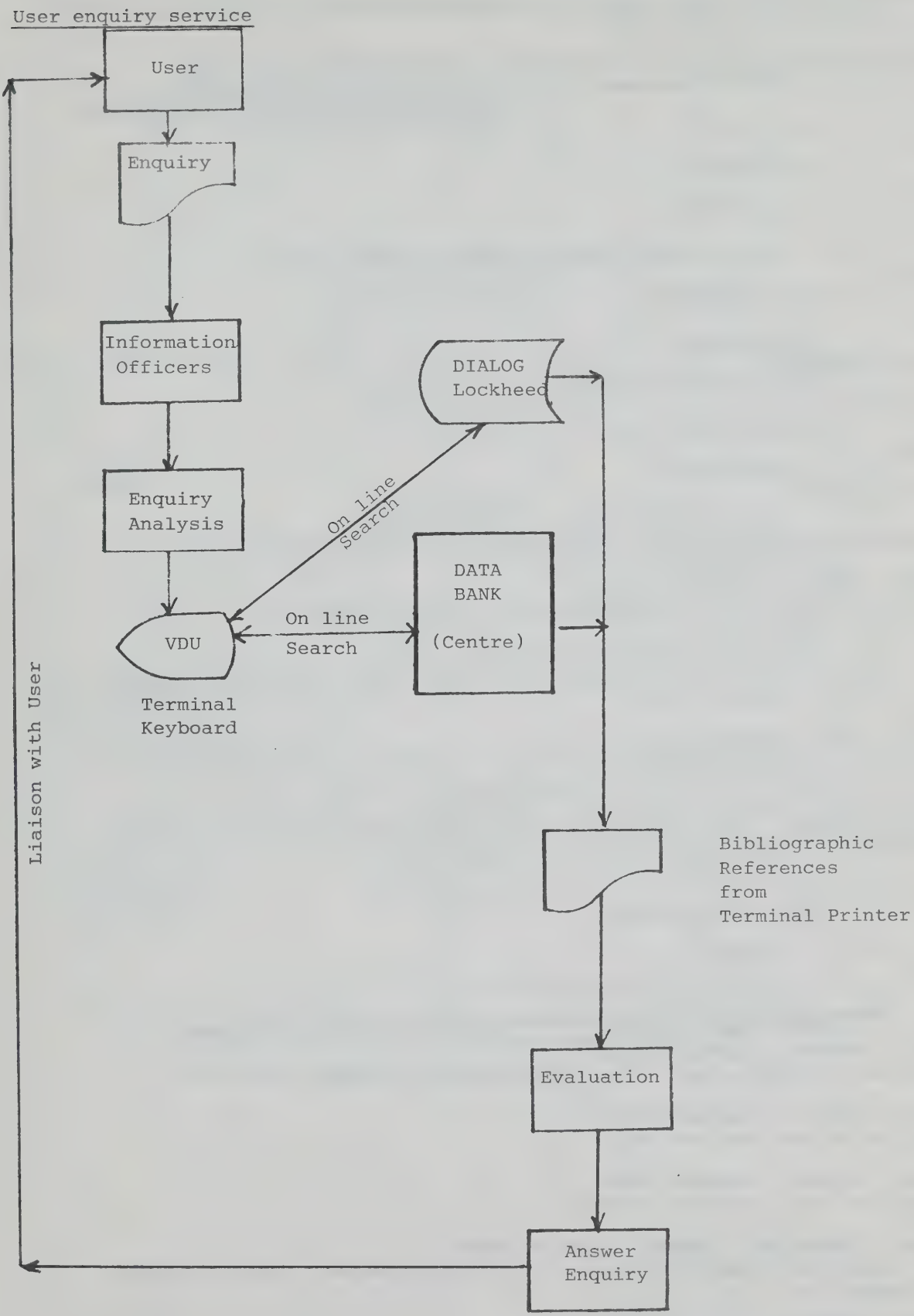

User enquiry service
User
Enquiry
Information Officers
Enquiry Analysis
VDU
Terminal Keyboard
On line Search
On line Search
DIALOG Lockheed
DATA BANK
(Centre)
Liaison with User
Bibliographic References from Terminal Printer
Evaluation
Answer Enquiry

Figure 7
DIALOG search

SEARCH ANALYSIS OF THE INK JET PRINTING PROCESS

```
File 08: INSPEC:1971-79.24 <-- Choose data base (Inspec):
          SET ITEMS DESCRIPTION
          --- ----- -----------
? sink? <-- User enters command next to question mark.
            1   425 INK? <-- Select INK? (? gives right-hand truncation)
? sjet?                      (Response from computer indicates Set 1 is 425 references
            2  6294 JET?      indexed under INK, INKS etc)
? sdrop?
            3  2732 DROP
? sprint?
            4  6036 PRINT?
? c1*(2+3)*4
            5   194 1*(2+3)*4 <-- Combine sets (*=AND, + = OR)
? sanalys?
            6 101117 ANALYS?
? sflow
            7 44189 FLOW
? sfluid(w)dynamics
            8  2036 FLUID(W)DYNAMICS
? sviscosity
            9  5600 VISCOSITY
? srheol?
           10  1358 RHEOL?
? c5*(6+7+8+9+10)
           11    15 5*(6+7+8+9+10)
? T11 <-- Type first reference (most recent) in Set 11
          TYPE 76B19460/2
76B019460  INSPEC  Journal Paper
  Some effects of fluid jet dynamics on ink jet printing
  Keur, R.I.; Stone, J.J.
  AB Dick Co., Elk Grove Village, IL, USA
  IEEE Trans. Ind. Appl. (USA), vol.IA12, no.1 p.86-90, 8 Refs,
Jan.-Feb. 1976 , Coden: itiac
  tmmaat
  Treatment APPLICATIONS, P
  Classification Codes: B5850
  Controlled Terms: printing / fluid dynamics / drops
  Uncontrolled Terms: fluid jet dynamics / ink jet printing /
recording surface / drop formation / drop charging / drop deflection
 / aerodynamic interactions / limiting factors

? saerodynamic?
           12  2684 AERODYNAMIC?
? c5*12
           13     8 5*12
? c11+13
           14    21 11+13
? t14/6 <-- Type refs from 13 in Format 6 (Titles only)
          TYPE 14/6/1-5
79A032615  INSPEC  Journal Paper
  Breakup of a liquid jet: third perturbation Cosserat solution

79C012980  INSPEC  Journal Paper
  Vented valve for ink jet head

79C001850  INSPEC  Journal Paper
  Osmotic ink jet viscosity control

78A025766, 78B018188  INSPEC  Journal Paper
  Drop formation characteristics of electrostatic ink jet using
water colored ink

78C005977  INSPEC  Journal Paper
  Aerodynamic correction for ink jet printing

? pr14/4 <-- Order off-line printout of set 14 in format 4 (includes abstract)
Printed 14/4/1-21
```

Figure 8

Processing information

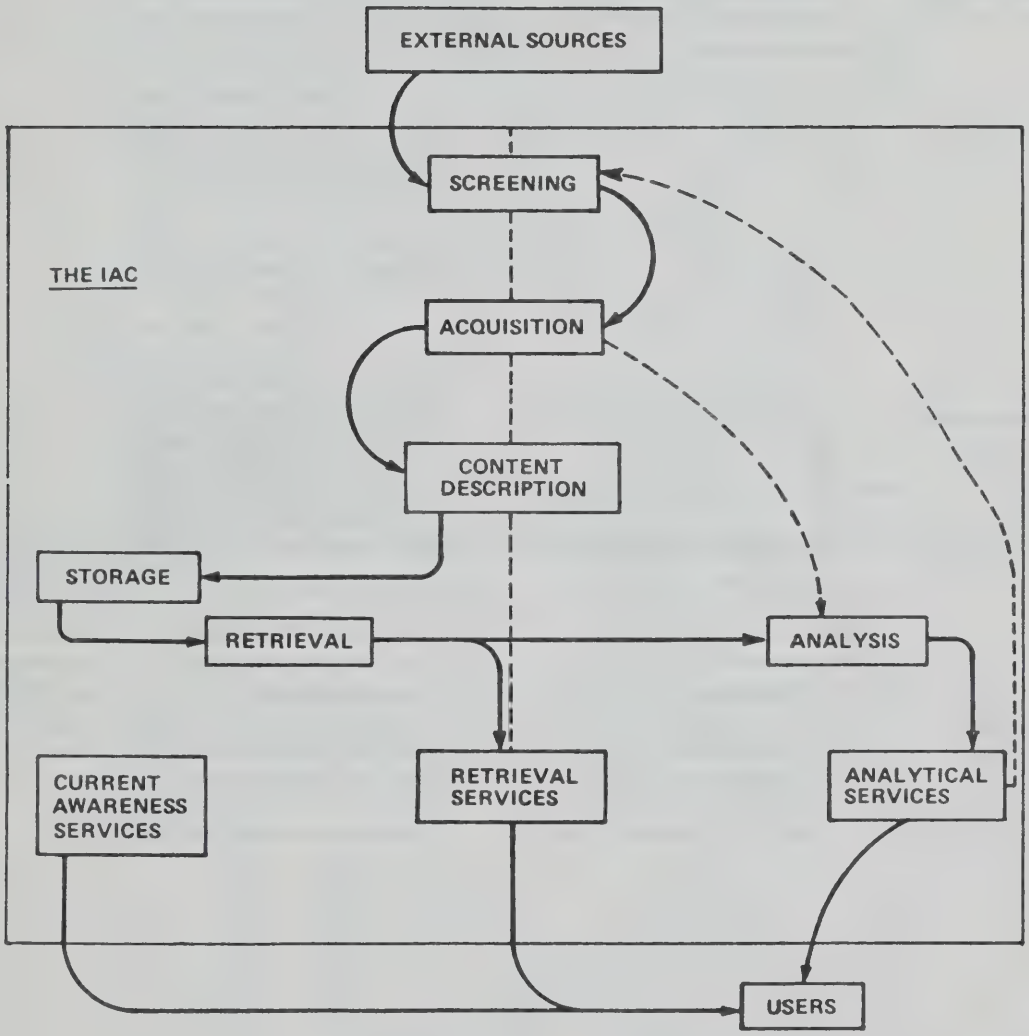


Figure 9

Organization of Centre

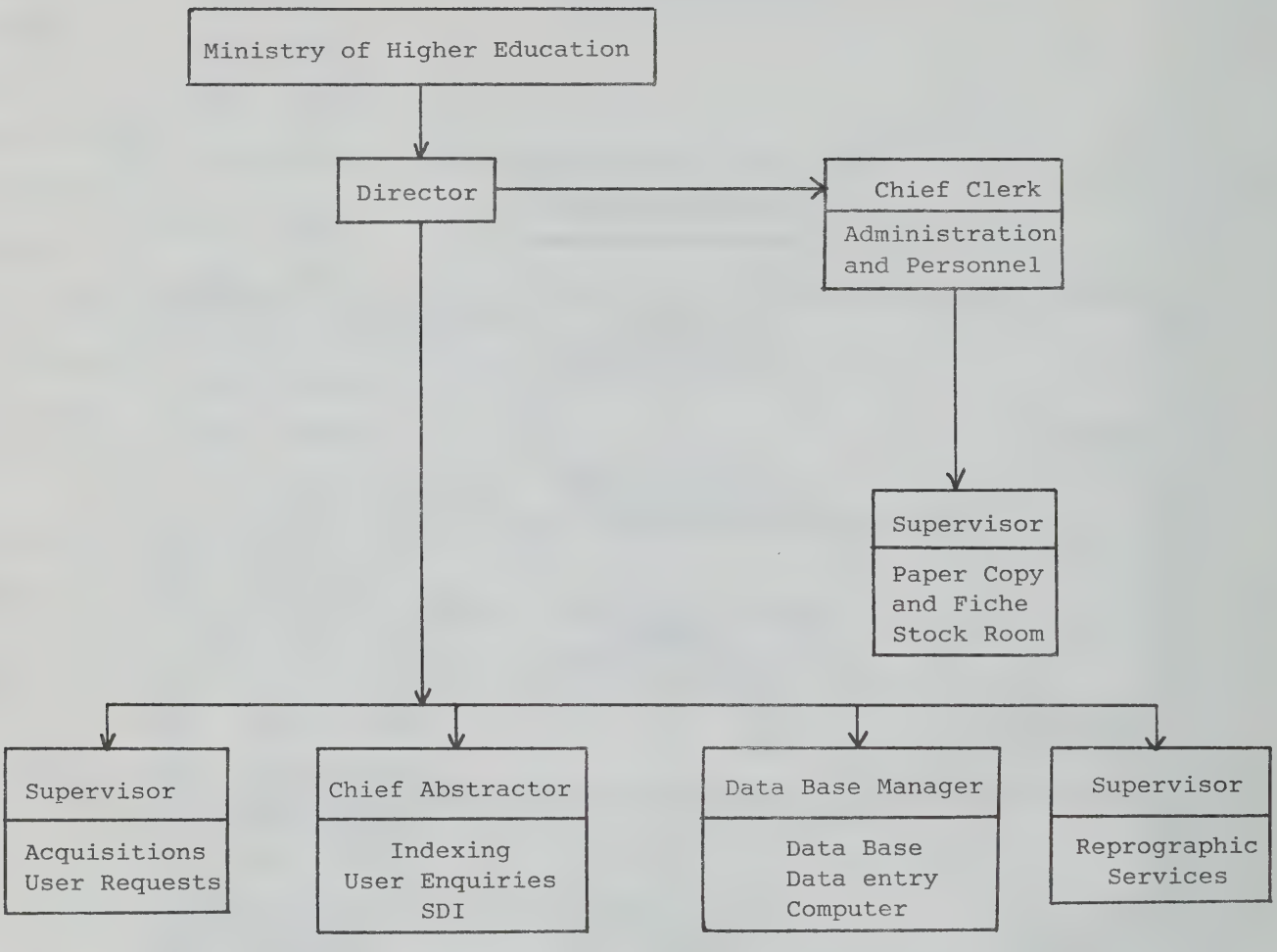


Figure 10

Significance of inverted file

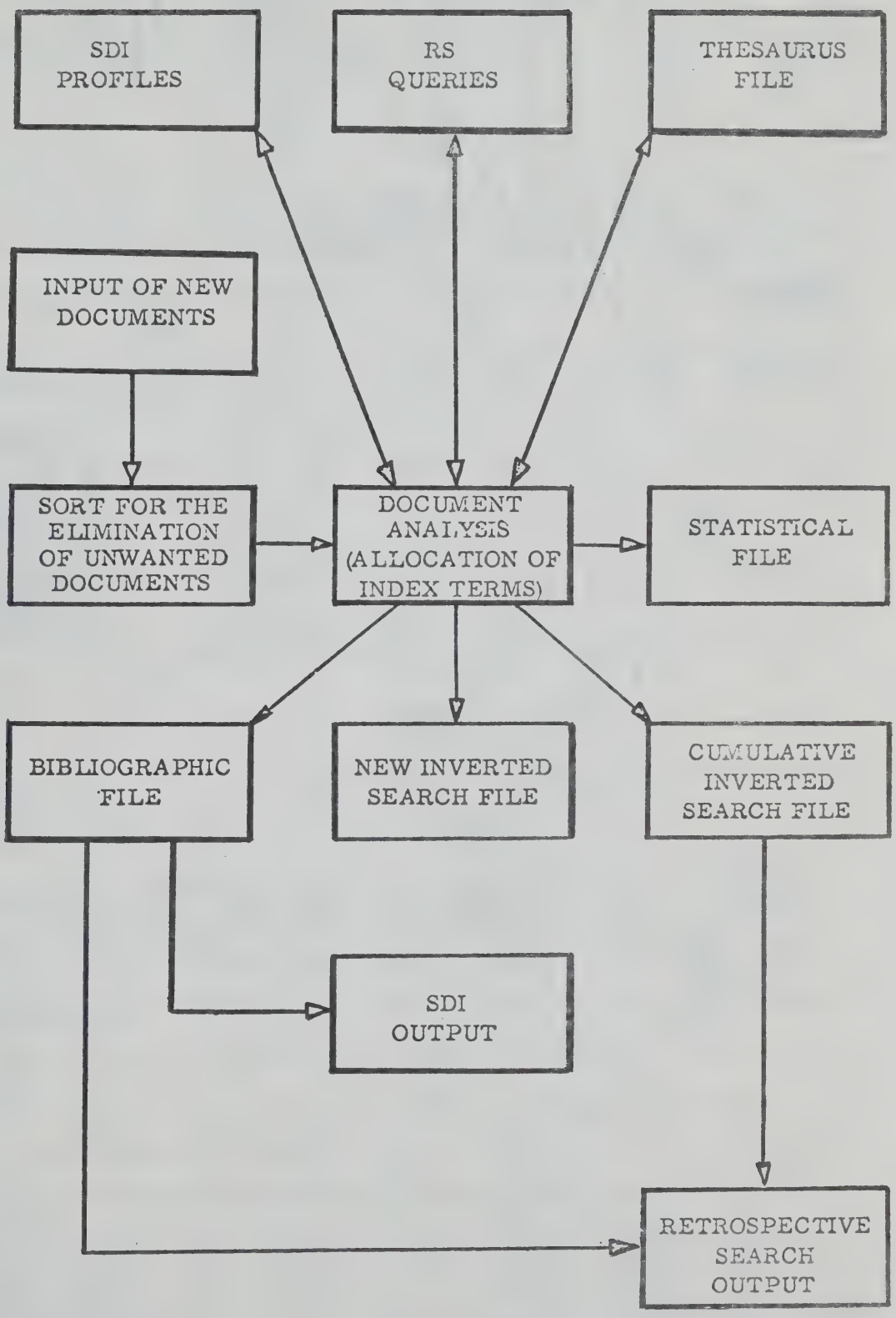


Figure 11

Searchable citation fields in well-known data bases

SEARCHABLE FIELDS •

FILE NUMBER	FILE NAME	AUTHOR	CLASSIFICATION	REPORT NUMBER	CORPORATE SOURCE	CORPORATE SOURCE CODE	WORDS IN TITLE	WORDS IN ABSTRACT	INDEXING TERMS (CONTROLLED)	INDEXING TERMS (UNCONTROLLED)	LANGUAGE	PATENTS	PATENT - CLASSIFICATION	COUNTRY OF PATENT	JOURNAL NAME	JOURNAL CODEN	JOURNAL CHAPTER	ISSUE NO. OF ABSTRACT JOURNAL	ISSN	PUBLISHER	SOURCE OF PUBLICATION	YEAR OF PUBLICATION	CHEMICAL NON-FRAGMENTS	DOCUMENT TYPE	YEAR OF ABSTRACT JOURNAL
1	NASA	AU=	CC=	RN=	/CS	SC=	/TI	-	/CT /CT•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	CA SEARCH	AU=	CC=	-	/CS	-	/TI	-	-	/UT	LA=	/PA /RP	PC=	-	-	CO=	-	-	SN=	-	-	-	-	-	-
3	METALS ABSTRACTS (METADEX)	AU=	CC= EN= (From 1979)	-	CS= /CS (From 1979)	-	/TI	-	/CT	-	LA= (From 1979)	-	-	-	JN= (From 1979)	-	-	-	-	-	-	-	-	-	-
4	ENGINEERING INDEX (COMPENDEX)	AU=	CC-	-	/CS	-	/TI	-	/CT /CT•	/UT	-	-	-	-	-	CO=	-	JA=	-	-	-	-	-	-	-
6	US GOVERNMENT REPORTS ANNOUNCEMENTS (NTIS)	AU=	CC= BC= CC= CN= EN=	-	/CS	CC=	/TI	-	/CT /CT•	/UT /UT•	-	-	-	-	-	CO=	-	-	-	-	-	-	-	-	-
7	BIOSIS	AU=		-	-	-	/TI	-	-	/UT	-	-	-	-	JN=	CO=	-	-	-	-	-	-	-	-	-
8	INSPEC	AU=	CC=	-	/CS	-	/TI	-	/CT	/UT	LA=	See Manual	-	CT=	JN=	CO=	-	-	-	PB=	-	-	-	-	-
9	WORLD ALUMINIUM ABSTRACTS	AU=	CC= RN= (From 1979)	-	CS= /CS	-	/TI	/AB	/CT	-	LA= (From 1979)	See Manual	-	CT= (From 1979)	JN= (From 1979)	-	-	-	-	-	-	-	-	-	-
10	ISMEC	AU=	CC=	-	CS= /CS	-	/TI	-	/CT	/UT	LA=	-	-	-	JN=	CO=	-	-	-	-	-	-	-	DT=	-
11	ENVIROLINE	AU=	CC=	-	CS=	-	/TI	/AB	/CT /CT•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	DT=	UP=
14	PASCAL	AU=	CC=	-	/CS	-	/TI	-	/CT	/UT	LA= Yes see Manual	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	OCEANIC	AU=	-	-	CS= /CS	-	/TI	/AB	/CT	/UT	LA=	-	-	-	-	-	-	-	-	-	-	-	-	-	UP=
18	POLLUTION ABSTRACTS	AU=	CC= (From 1978)	-	/CS	-	/TI	/AB (From 1978)	/CT	/UT	LA=	-	-	-	-	CO= (From 1978)	-	-	-	-	-	-	-	-	-
19	ENERGYLINE	AU=	CC=	-	CS= /CS	-	/TI	/AB	/CT /CT•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	DT=	-
31	INSPEC INFORMATION	AU=	CC=	-	CS= /CS	-	/TI	/AB	/CT	/UT	LA=	-	-	-	JN=	CO=	-	-	-	PB=	-	-	-	-	DT=	-
32	PARING (EUSIDIC)	-	-	-	/CS	-	/TI	-	/CT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Figure 12

Acquisition system

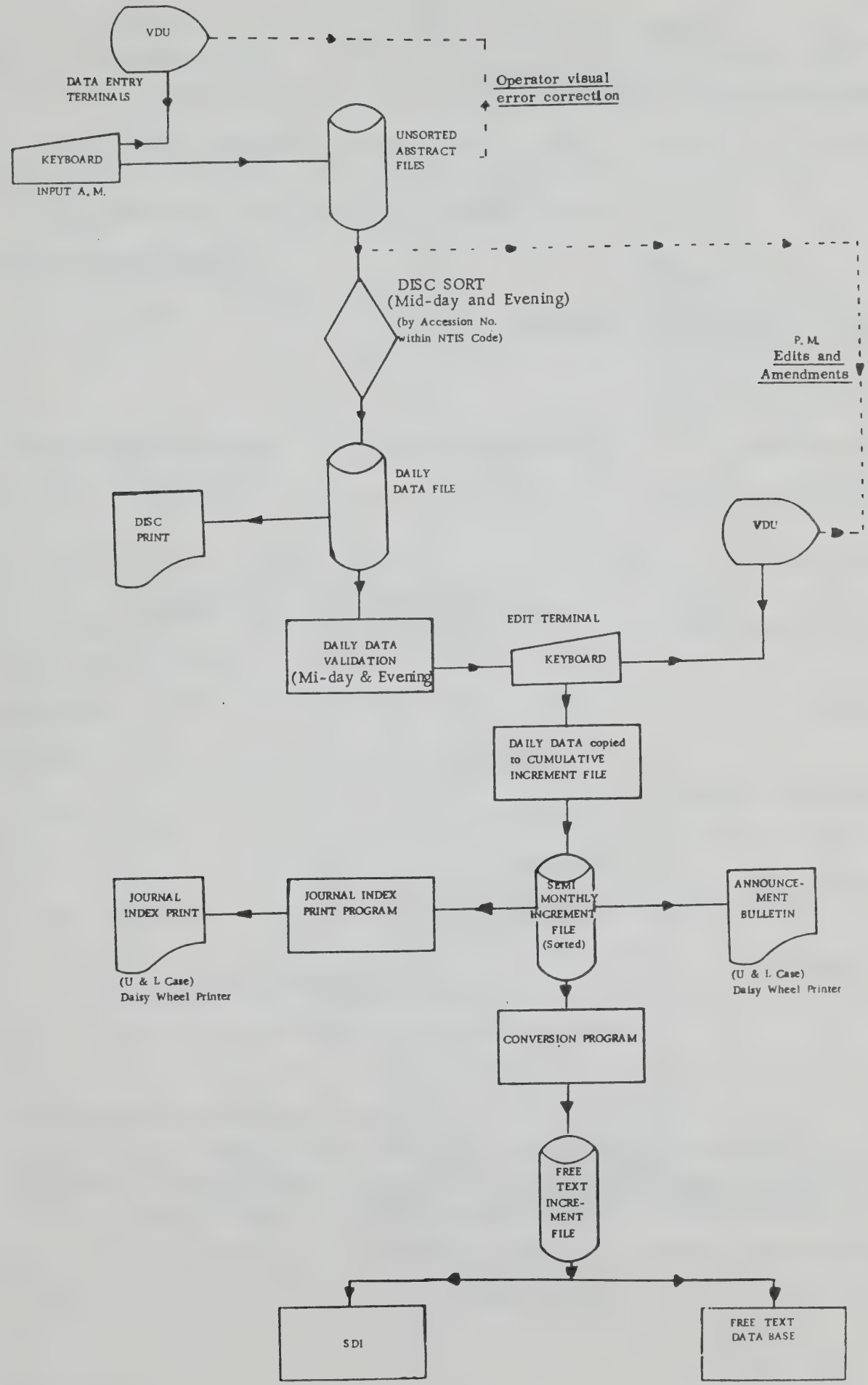


Figure 13

Process sheet

2. Batch Entry Number (R, P or A): PB0-1234	DATA ENTRY FORM DOCUMENT PROCESSING SHEET	1. NTIS Reference: 46A
	3. Originators Ref, Patent Applic. or Coden: PAT-APPL-925130	4. Agency Ref. or Classification:	5. Increment No.: 80 16

6. Originator (Corporate Author, Author Affiliation or Assignees)

National Aeronautics & Space Administration, Langley, Va., USA

7. Title

CdS SOLID STATE PHASE INSENSITIVE ULTRASONIC TRANSDUCER

7a. Language (if not Arabic or English)

9. Conference (Title, Place and Date) or Country of Patent

USA

10. First Author or Inventor	11. Second Author or Inventor	12. Date (or Date Filed)	13. Pages & Refs.
Heyman, J. S.		26.7.1978	5 pp

14. Contract No. or Date Patent Granted	15. Project No.	16. Other Ref.
25.3.1980		

17. Availability & Price	18. Patent No. or ISBN
Patent Office	USP - 4195244

19. Abstract: (see over for special notes)

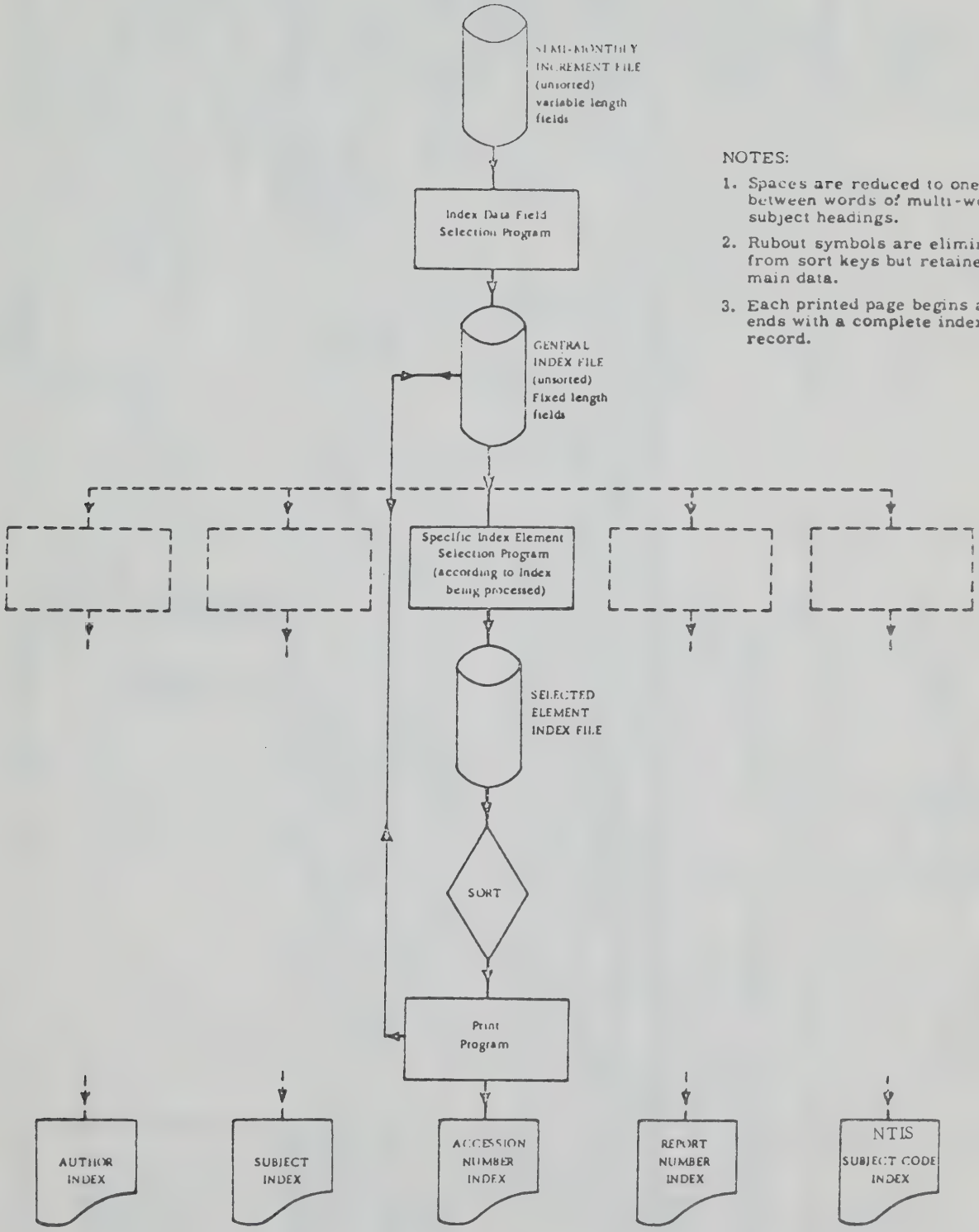
20. Indexing Terms			20a. NTIS Codes
* Cadmium sulfides	Acoustics		46D
	Attenuation		49C
* Ultrasonic frequencies	Receivers		
	Signal processing		
* Transducers			
		+ Ultrasonic transducers	
*		+	
		+	
*		+	
		+	

Received		Recorded		Abstracted		Typed		Checked	
Initials: NH	Date: 23/8/80	Initials: STN	Date: 21/8/80	Initials: [illegible]	Date: 26/8/80	Initials	Date	Initials	Date

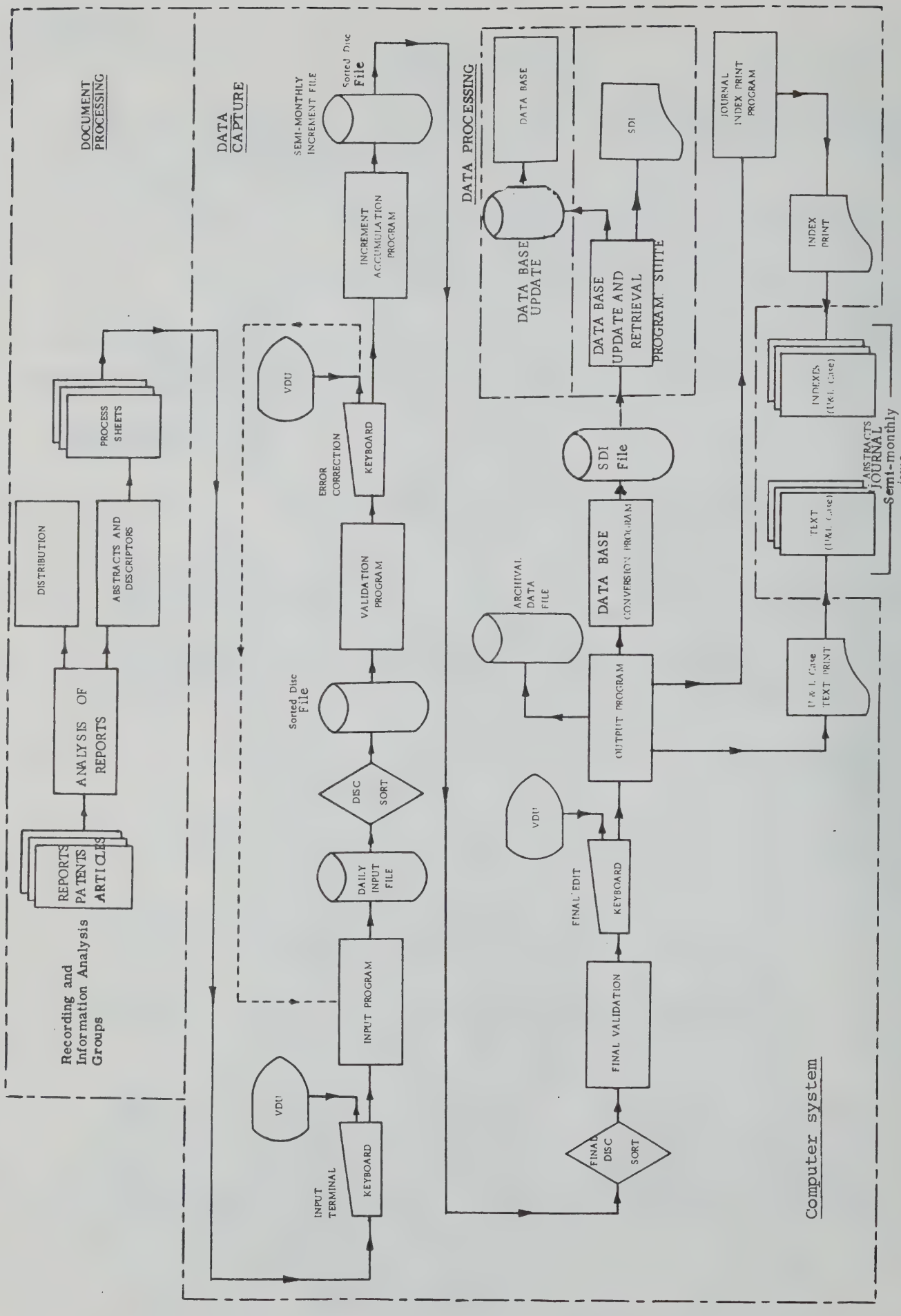
No. of Copies 2

Figure 14

Bulletin index production

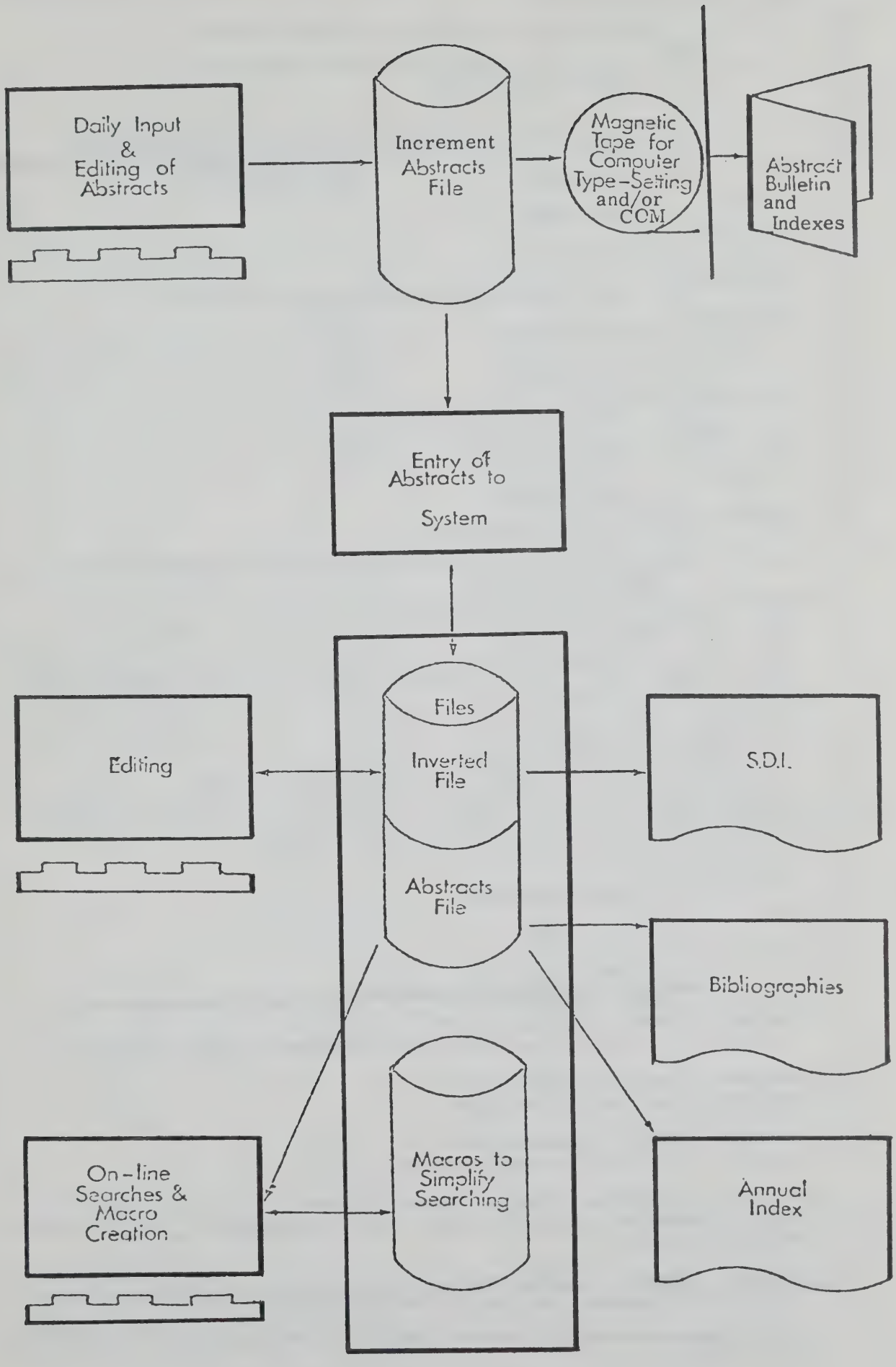


JOURNAL INDEX SYSTEM


DOCUMENT PROCESSING
DATA CAPTURE
DATA PROCESSING
Recording and Information Analysis Groups
Computer system
REPORTS PATENTS ARTICLES
ANALYSIS OF REPORTS
DISTRIBUTION
ABSTRACTS AND DESCRIPTORS
PROCESS SHEETS
INPUT TERMINAL
KEYBOARD
VDU
INPUT PROGRAM
DAILY INPUT FILE
DISC SORT
Sorted Disc File
VALIDATION PROGRAM
ERROR CORRECTION
KEYBOARD
VDU
SEMI-MONTHLY INCREMENT FILE
Sorted Disc File
INCREMENT ACCUMULATION PROGRAM
FINAL DISC SORT
FINAL VALIDATION
FINAL EDIT
KEYBOARD
VDU
OUTPUT PROGRAM
ARCHIVAL DATA FILE
DATA BASE CONVERSION PROGRAM
SDI File
DATA BASE UPDATE
DATA BASE
DATA BASE UPDATE AND RETRIEVAL PROGRAM SUITE
SDI
JOURNAL INDEX PRINT PROGRAM
INDEX PRINT
INDEXES (Until Case)
TEXT (Until Case)
Until Case TEXT PRINT
ABSTRACTS JOURNAL Semi-monthly issue

Data base cumulation

Figure 16



Sample retrospective search

SEARCH ANALYSIS OF THE INK JET PRINTING PROCESS

```
File 08: INSPEC:1971-79.24 <-- Choose data base (Inspec):
          SET  ITEMS  DESCRIPTION
          ---  -----  -----------
? sink? <-- User enters command next to question mark.
            1    425  INK? <-- Select INK? (? gives right-hand truncation)
? sjet?                    (Response from computer indicates Set 1 is 425 references
            2   6294  JET?  indexed under INK, INKS etc)
? sdrop?
            3   2732  DROP
? sprint?
            4   6036  PRINT?
? c1*(2+3)*4
            5    194  1*(2+3)*4 <-- Combine sets (*=AND, + = OR)
? sanalys?
            6 101117  ANALYS?
? sflow
            7  44189  FLOW
? sfluid(w)dynamics
            8   2036  FLUID(W)DYNAMICS
? sviscosity
            9   5600  VISCOSITY
? srheol?
           10   1358  RHEOL?
? c5*(6+7+8+9+10)
           11     15  5*(6+7+8+9+10)
? T11 <-- Type first reference (most recent) in Set 11
           TYPE 76B19460/2
76B019460  INSPEC  Journal Paper
  Some effects of fluid jet dynamics on ink jet printing
  Keur, R.I.; Stone, J.J.
  AB Dick Co., Elk Grove Village, IL, USA
  IEEE Trans. Ind. Appl. (USA), vol.IA12, no.1 p.86-90, 8 Refs,
Jan.-Feb. 1976 , Coden: itiac
  tmmaat
  Treatment APPLICATIONS, P
  Classification Codes: B5850
  Controlled Terms: printing / fluid dynamics / drops
  Uncontrolled Terms: fluid jet dynamics / ink jet printing /
recording surface / drop formation / drop charging / drop deflection
 / aerodynamic interactions / limiting factors

? saerodynamic?
           12   2684  AERODYNAMIC?
? c5*12
           13      8  5*12
? c11+13
           14     21  11+13
? t14/6 <-- Type refs from 13 in Format 6 (Titles only)
           TYPE 14/6/1-5
79A032615  INSPEC  Journal Paper
  Breakup of a liquid jet: third perturbation Cosserat solution

79C012980  INSPEC  Journal Paper
  Vented valve for ink jet head

79C001850  INSPEC  Journal Paper
  Osmotic ink jet viscosity control

78A025766, 78B018188  INSPEC  Journal Paper
  Drop formation characteristics of electrostatic ink jet using
water colored ink

78C005977  INSPEC  Journal Paper
  Aerodynamic correction for ink jet printing

? pr14/4 <-- Order off-line printout of set 14 in format 4 (includes abstract)
Printed 14/4/1-21
```

Implementation table

Figure 18

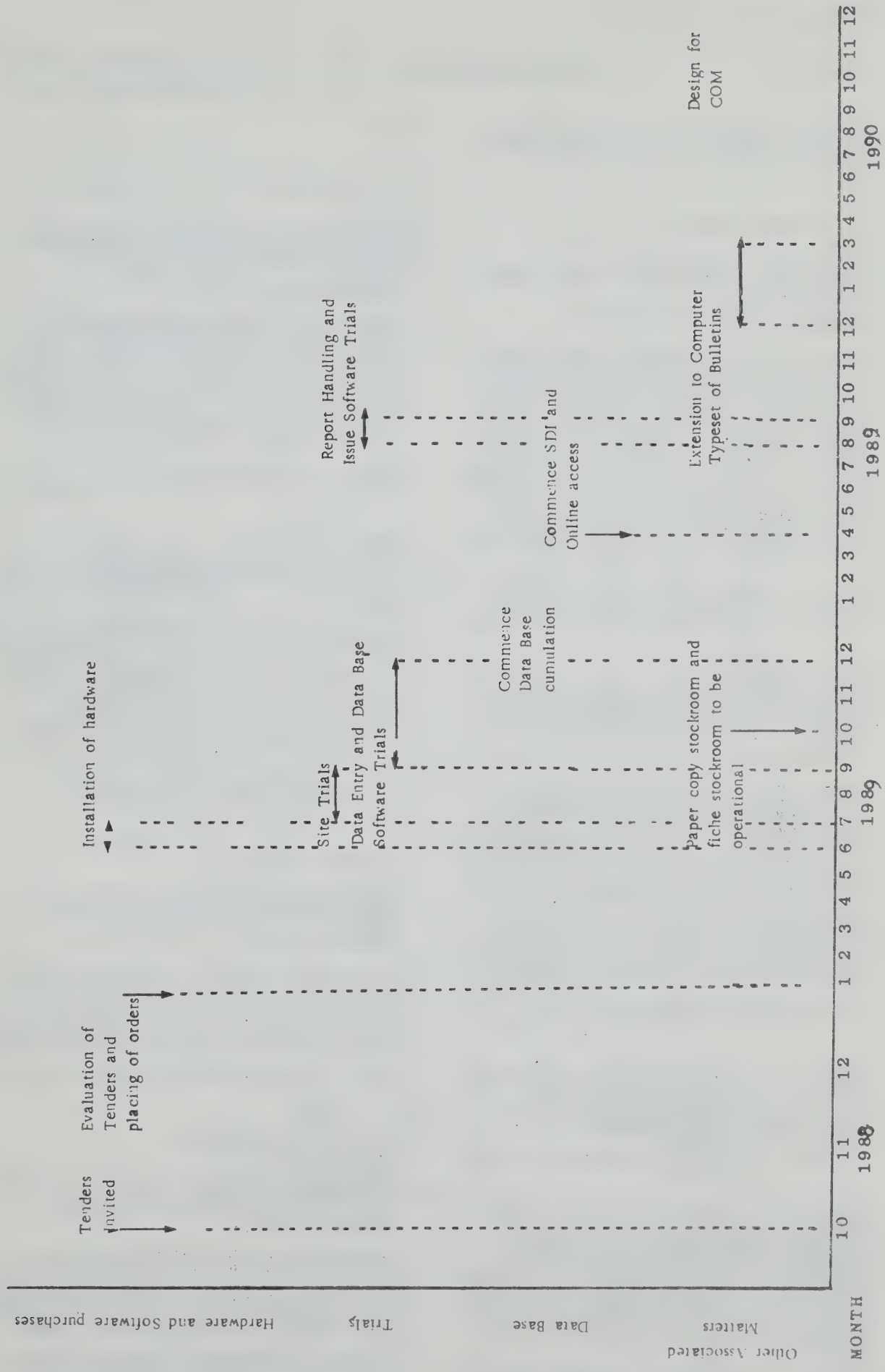


Figure 19

Computer typeset bulletin

Indexing terms: *Circulation/*Ecology/*Waste disposal/ *Automobile bodies/Recycling/Automobiles/Motor vehicles/ Passenger vehicles//13b/

13H Industrial Processes

T74-05061 RI-7914
Bureau of Mines,Coll.Park,Md.,USA
COPPER REMOVAL FROM MOLTEN FERROUS SCRAP: A PILOT PLANT STUDY
Makar,H.V. Brown,R.E. 1974 11pp 5ref
Availability: TRC £0.70

The Bureau of Mines successfully demonstrated, on a pilot plant scale, a sodium sulphate (Na2SO4) refining process for removal of copper from molten ferrous scrap. Previous tests established technical feasibility on a bench scale for achieving low copper concentrations and determining the principal factors controlling process efficiency. The pilot plant study involved a 1-ton arc furnace for melting ferrous scrap and a 1-1/2-ton treatment ladle. Results of these tests showed that copper removals obtained in laboratory tests (approximately 40 relative percent copper removal with 10 weight-percent surface addition of sodium sulphate) could be achieved on the pilot plant scale when excess carbon was added with sodium sulphate compacts. Data were obtained on temperature losses and carbon consumption related to Na2SO4 treatment. 1130-3002

Indexing terms: *Industrial waste treatment/*Materials recovery/*Iron alloys/*Copper/Waste treatemnt/Industrial wastes/Recovery/Ferrous metals//13h/

T74-05191 RI-7877
Bureau of Mines,Rolla,Mo.,USA
DEVELOPMENT AND APPLICATION OF THE WASTE-PLUS-WASTE PROCESS FOR RECOVERING METALS FROM ELECTROPLATING AND OTHER WASTES
Cochran,A.A. George,L.C. 1974 19pp 24ref
Availability: TRC £0.70

Laboratory-scale research was conducted to develop a new process for treating electroplating and other wastes. Various acid and alkaline cyanide wastes were combined under controlled conditions to neutralize the wastes and to almost completely precipitate the metals and cyanides. The metals were subsequently recovered for recycling; the cyanides can also be easily recycled. The process was successfully used to treat the major types of electroplating and etching wastes, containing Cd, Cr, Cu, Ni, and Zn, and to treat both concentrated and dilute wastes. The economic aspects of treating concentrated electroplating, etching, and anodizing wastes are especially attractive because of the low cost of mixing 2 wastes, the high value of the recovered metals, and the simplicity of the recovery procedures. 1131-3002

Indexing terms: *Materials recovery/*Electroplating/ Recovery/Metals/Industrial wastes//13h/

T74-05477 RAE-LIB-T-1751
Deutsche Luft-und Raumfahrt,DLR-FB-73-99,1973,Germany
HYBRID ELECTROHYDRAULIC STICK-FORCE SIMULATOR (Translated from German)
HYBRIDER ELEKTROHYDRAULISCHER STEUERKRAFTSIMULATOR
Erdmann,F. Dierke,R. 6.1974 41pp 4ref
DLR-FB-73-99
Availability: TRC £1.10

The development of a mathematical model for the artificial presentation of control-column loads is described. The non-linear model is realised by hybrid computing elements, an electric force-sensitive device and an electrohydraulic servosystem. The result of the investigation is a compact and flexible control force system. Damping, Coulomb-friction and column inertia are adjustable. The trim-point and the gradient are controllable by analogue and digital simulation processors. The midpoint can be marked by a notch or break-out force. 1132-3002

Indexing terms: *Electrohydraulic effect/*Servomechnisms/ *Control equipment/*Simulators/Mathematical models//13h/ 51c/94f/

13I Machinery and Tools

T74-05161
Defence Standards Labs,Melbourne,Victoria,Australia
EFFECT OF DIFFERENT HEAT TREATMENTS ON THE WEAR OF HIGH SPEED STEEL CUTTING TOOLS
Doyle,E.D. 10.1973 7pp 4ref
Availability: TRC £0.50

High speed steel tool tips were given different heat treatments to vary the microstructure, and the nature of the wear produced in turning tests was examined under the scanning electron microscope. Wear was mainly confined to either the rake face or clearance face, the form of wear being dependent on the particular heat treatment of the tool steel. The forms and mechanisms of tool wear are discussed in terms of the changes in microstructure produced by the different heat treatments. (In: Wear,Vol.27,1974,295-301) 1133-3002

Indexing terms: *Cutting tools/*Heat treatment/ *Microstructure/Tool steels/Metals/Electron microscopy//13i/ 94f/

T74-05809 ISVR-TR-63
Southampton Univ.,Inst.of Sound & Vibration Res.,UK
ISOLATION OF MACHINERY FROM FLEXIBLE MOUNTS
Milsted,M.G. 12.1973 35pp 8ref
Availability: TRC £1.00

The general method of analysis is as follows. The problem is treated as one of interaction of three separate subsystems; viz: a source, a transmission structure such as system of isolators, and a foundation or receiver. In this analysis the source has been constrained to have only rigid-body motions and the isolators have been taken as parallel spring-damper combinations. The analytical formulation of the problem is developed and applied to beam-type foundations where only plane motion of the source is allowed. 1134-3002

Indexing terms: *Foundations/*Vibration/*Machinery/ Isolators/Sound transmission/Damping//13i/94f/20k/

13J Marine Engineering

T74-05472 AEW-REP-19-72
Admiralty Experiment Works,Haslar,Hants.,UK
EFFECT OF BILGE KEEL SIZE ON ROLL REDUCTION
Bolton,W.E. 9.1972 26pp 5ref
Availability: TRC £1.00

Describes a series of model tests which were conducted in order to devise a method for choosing the size of bilge keels necessary to give a specified amount of roll damping. Model test results indicated that a method of selecting bilge keel size could be derived and an interim method, using existing theory in conjunction with these experiments, is suggested. 1135-3002

Indexing terms: *Ship hulls/*Rolling/*Damping/Waves//13j/

13M Structural Engineering

T74-05030 CRREL-SR-204
Cold Regions Res. & Engineering Lab.,Hanover,N.H.,USA
BIBLIOGRAPHY ON WINTER CONSRUCTION 1967-1971
Kaplar,C.W. Metrish,R.M. 4.1974 77pp 746ref
Availability: TRC £2.00

The bibliography covers world literature published during 1967-1971 on the subject of construction during cold weather. The contents are drawn mainly from the continuing current literature search performed by the Science and Technology Division of the Library of Congress for the U.S. Army Cold Regions Research and Engineering Laboratory. 1136-3002

Indexing terms: *Bibliographies/*Cold weather construction/ *Frozen soils/Cold weather operations/Earthwork//13m/

Document flow

Figure 20

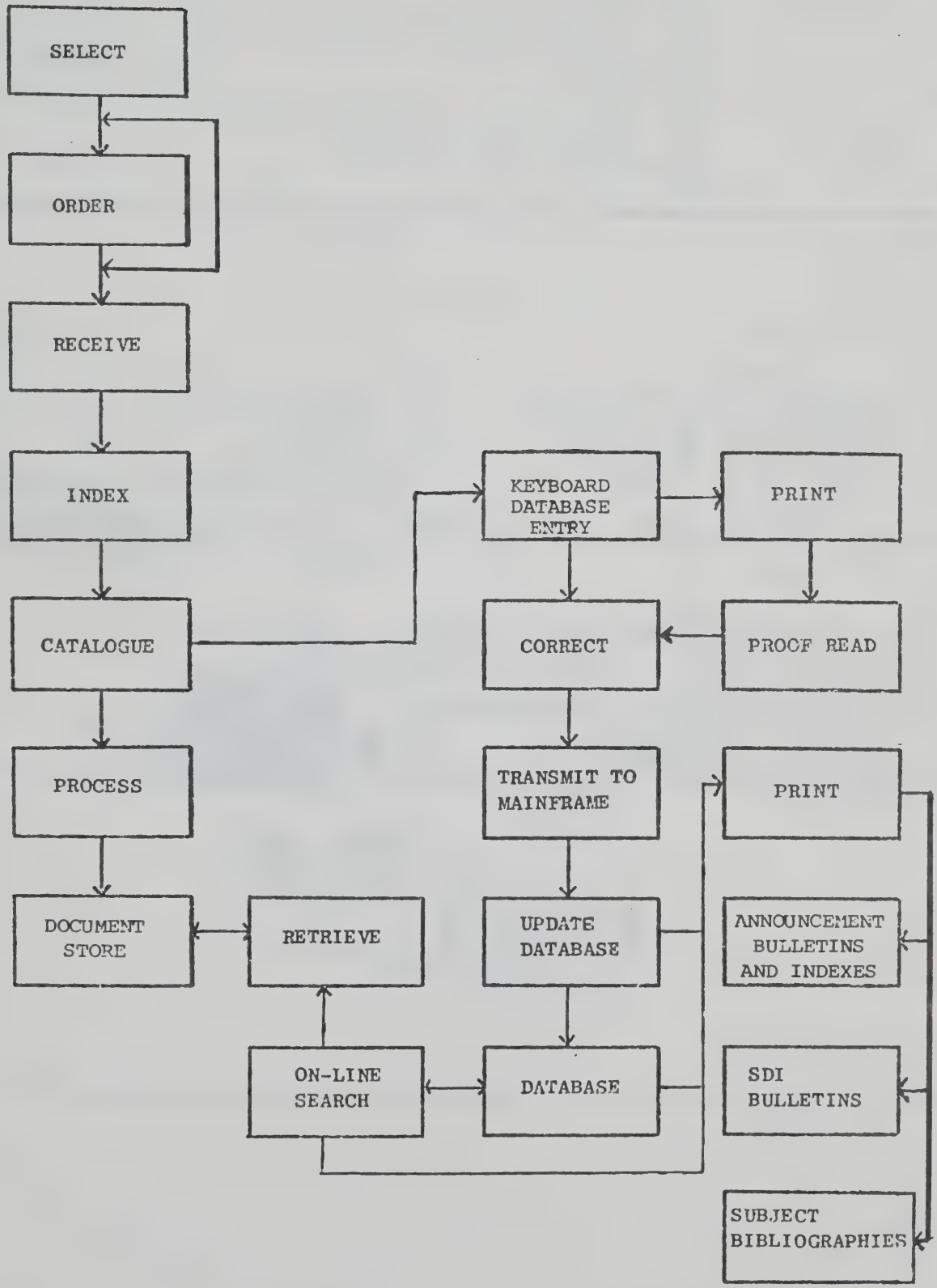


Figure 21

Computer output on microfilm

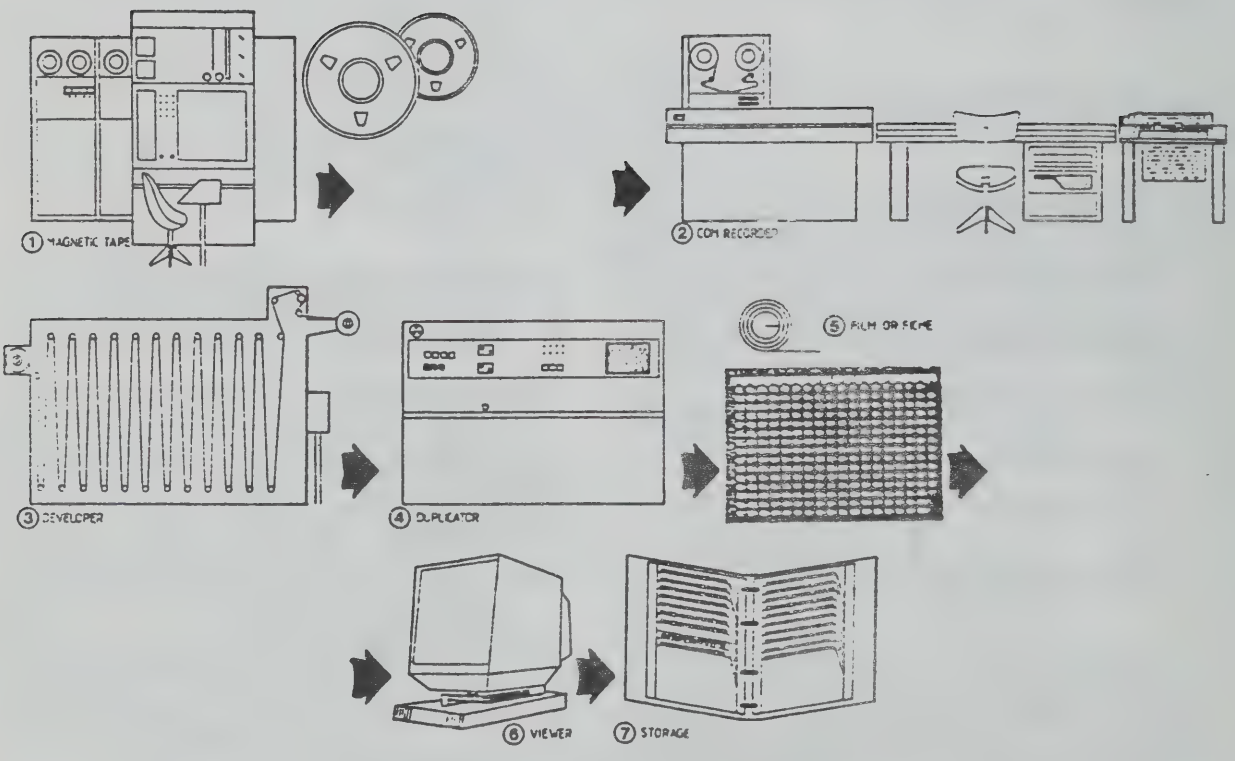


Figure 22

ARAB INDUSTRIAL DEVELOPMENT ORGANIZATION — Process sheet

المنظمة العربية للتنمية الصناعية

DOCUMENTATION WORK-SHEET

التوثيق (ورقة عمل)

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